

AKAI

MODEL **S612**

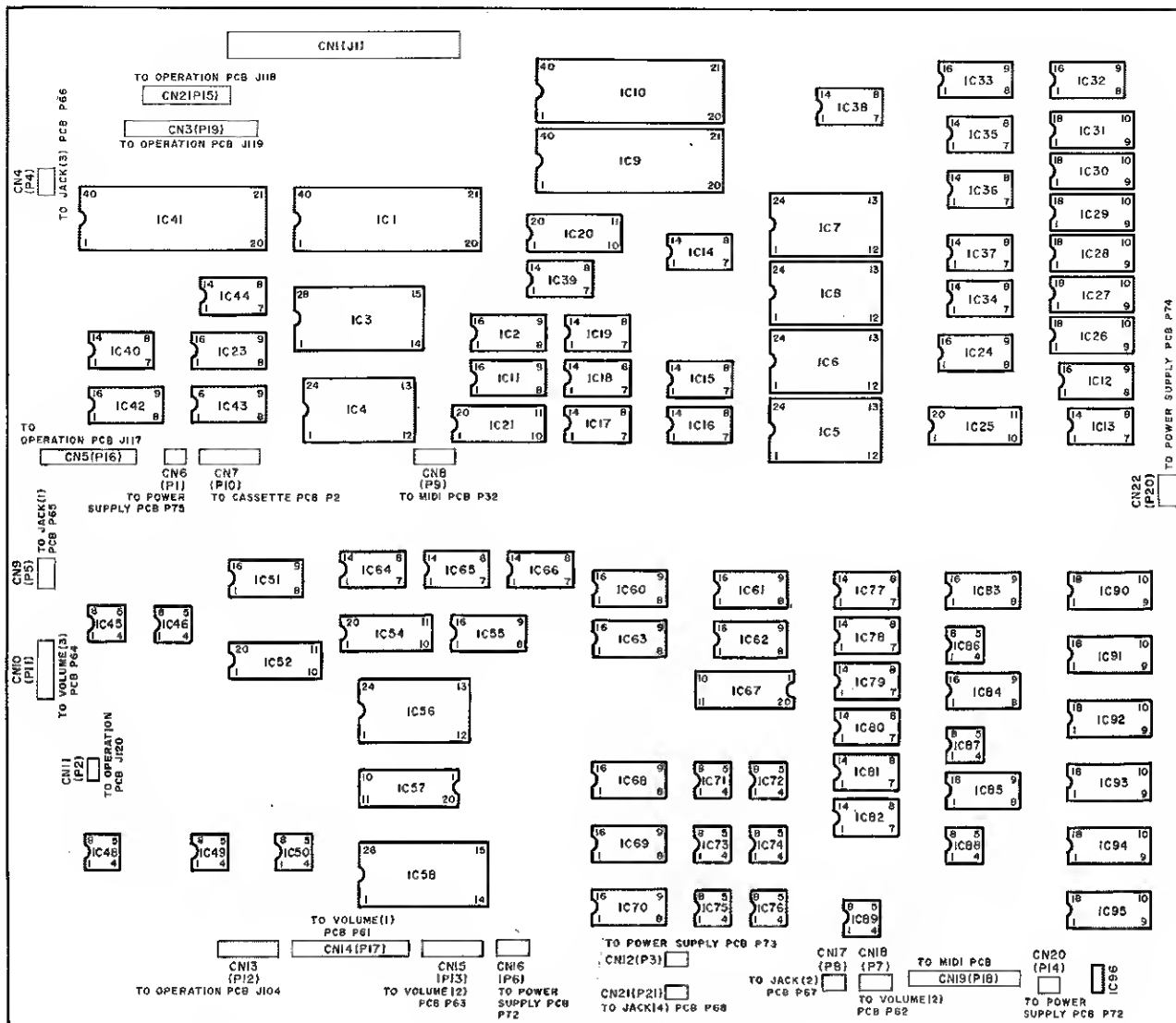
SECTION 4 SCHEMATIC DIAGRAM AND PC BOARDS

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Various IC Parts Location of MAIN PCB



MAIN PCB L600IA5010

The Voltage Levels at Various IC Pins of MAIN PCB

[illegible]

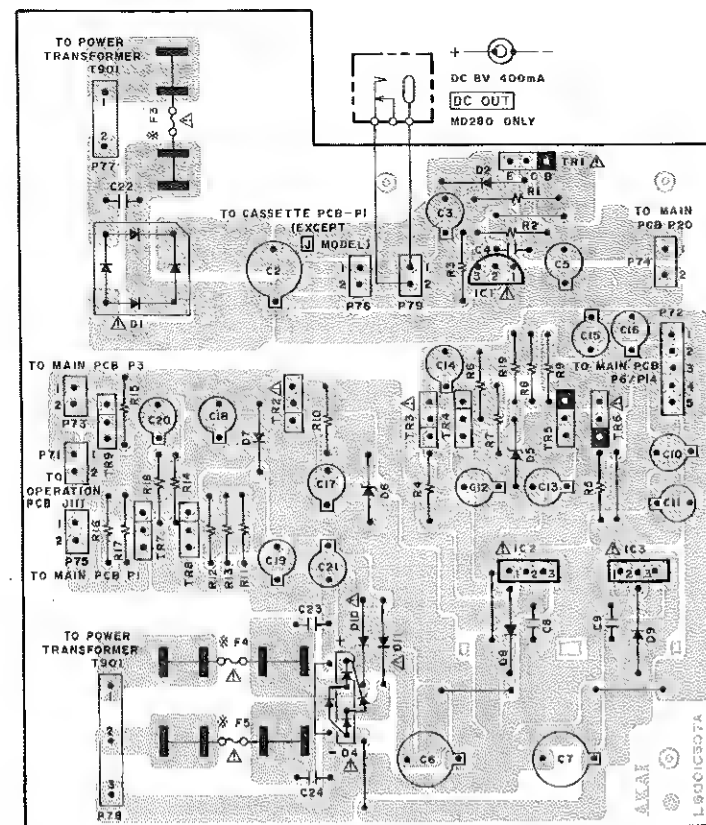
* VOLTAGE INDICATED AT POWER ON WITH DIGITAL TYPE TESTER.

* ANL: ANALOG

DIG: DIGITAL

* (P) INDICATED AT PULSE

- 25C3242
25B891
25D1181
25A1317
25C3330
25B1015

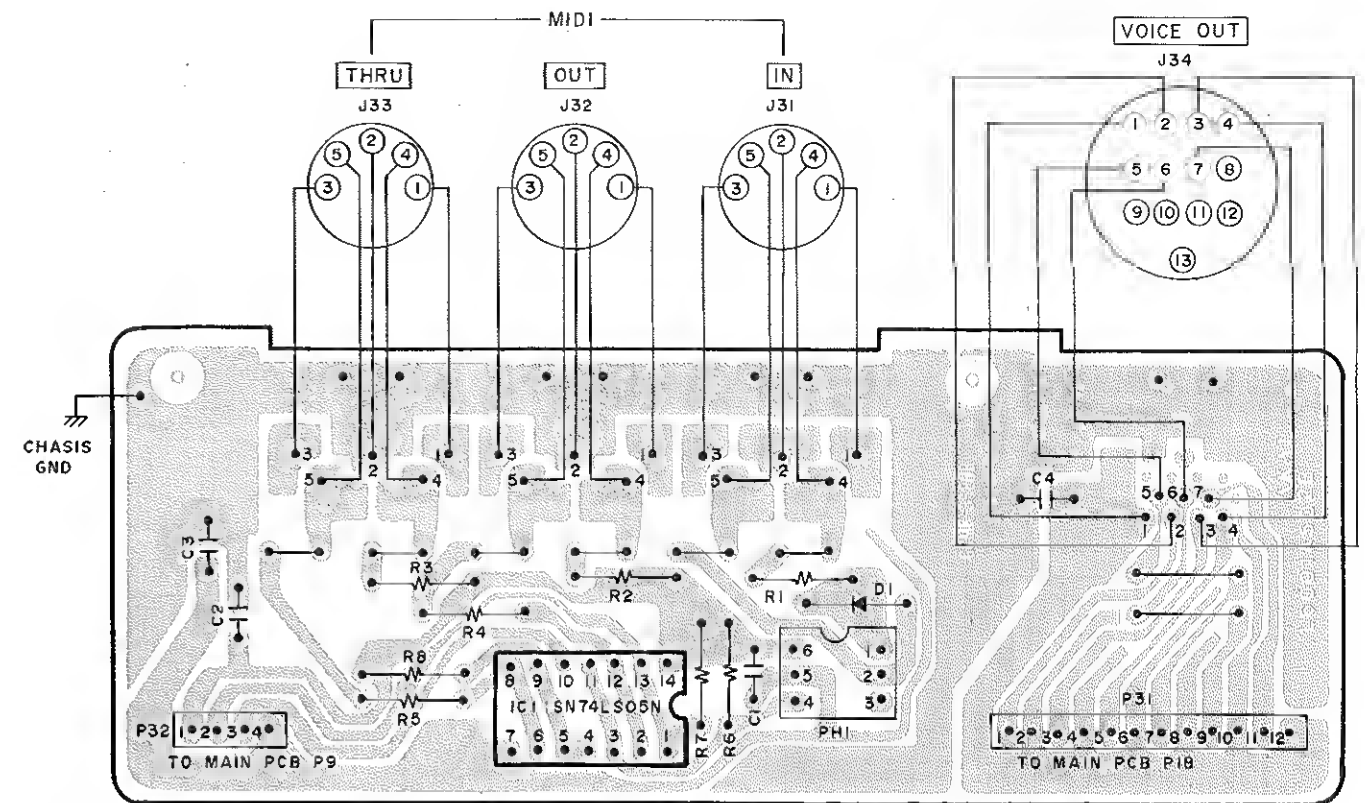


SUPPLY PCB L6001C507A

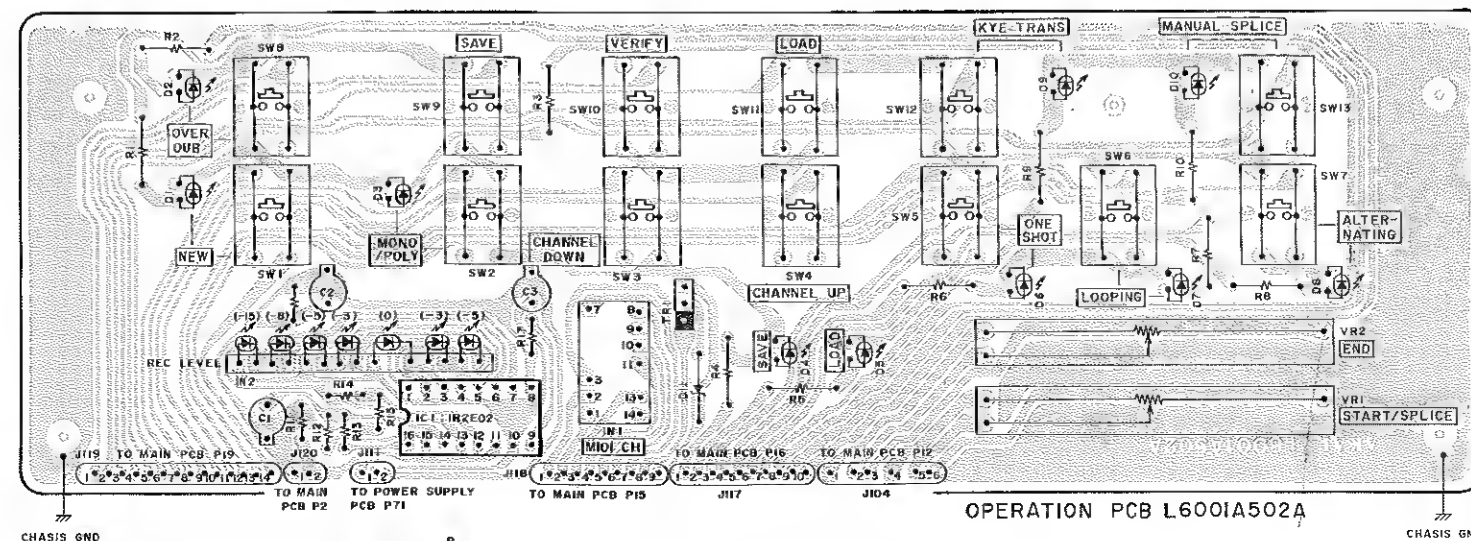
PNP TRANSISTOR
NPN TRANSISTOR

	F3	F4	F5
4A 250V	4A 125V	T3.15A 250V	
630mA 250V	630mA 125V	T500mA 250V	
630mA 250V	630mA 125V	T500mA 250V	

WARNING: Δ INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.
AVERTISSEMENT: Δ IL INDIQUE LES COMPOSANTS CRITIQUES DE SÉCURITÉ. POUR MAINTENIR LE DEGRÉ DE SÉCURITÉ DE L'APPAREIL, NE REMPLACER QUE DES PIÈCES RECOMMANDÉES PAR LE FABRICANT.



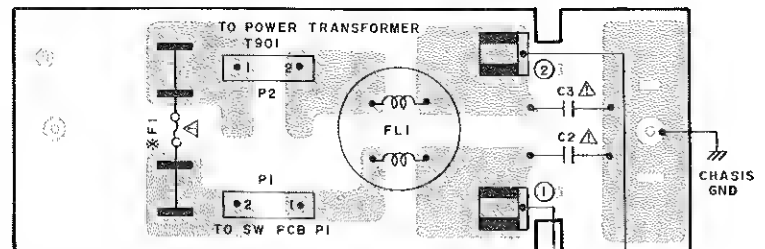
MIDI PCB L6001A502B



OPERATION PCB L6001A502A

PNP TRANSISTOR
25A1317

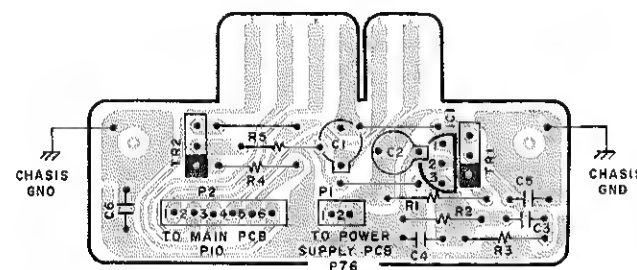
* J	C.A	E.V.S.B
F1 1.25A 250V	1.6A 125A	T500mA 250V



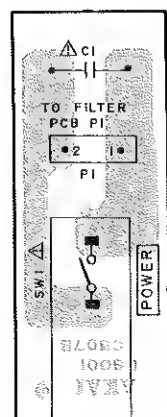
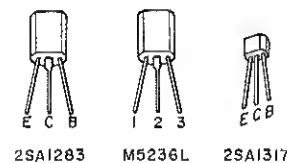
FILTER PCB L600ID5080

WARNING: Δ INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.
 AVERTISSEMENT: Δ IL INDIQUE LES COMPOSANTS CRITIQUES DE SÉCURITÉ. POUR MAINTENIR LE DEGRÉ DE SÉCURITÉ DE L'APPAREIL, NE REMPLACER QUE DES PIÈCES RECOMMANDÉES PAR LE FABRICANT.

J AC 100V 50/60Hz
 A.C AC 120V 60Hz
 E.V.S AC220V~240V 50Hz
 INLET



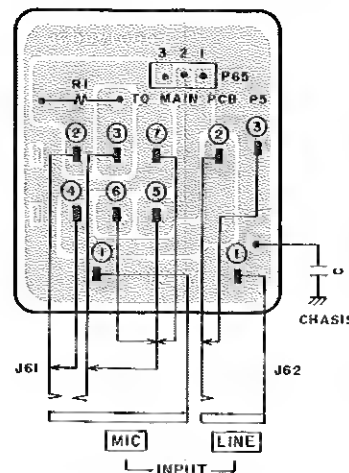
**CASSETTE PCB L600ID5040
EXCEPT J MODEL**



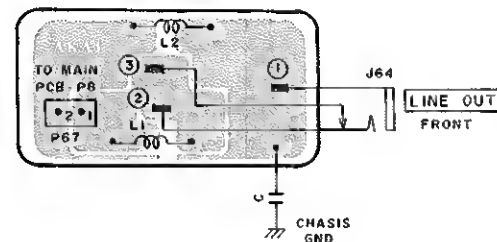
**SW PCB
L600IC507B**

WARNING: Δ INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.
 AVERTISSEMENT: Δ IL INDIQUE LES COMPOSANTS CRITIQUES DE SÉCURITÉ. POUR MAINTENIR LE DEGRÉ DE SÉCURITÉ DE L'APPAREIL, NE REMPLACER QUE DES PIÈCES RECOMMANDÉES PAR LE FABRICANT.

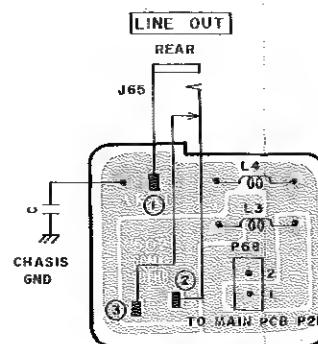
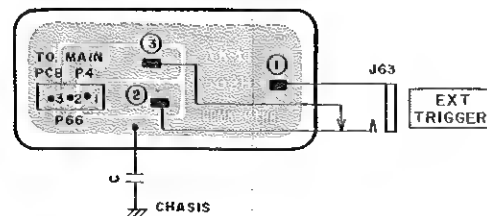
**JACK (1) PCB
L600IA502F**



**JACK (2) PCB
L600IA502G**

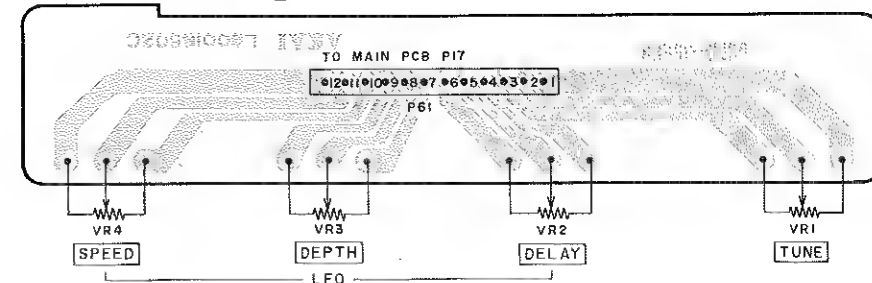


**JACK (3) PCB
L600IA502H**

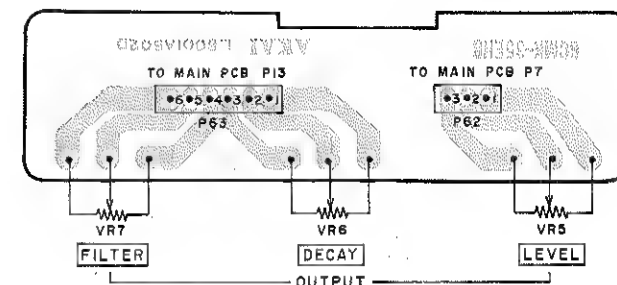


**JACK (4) PCB
L600IA502I**

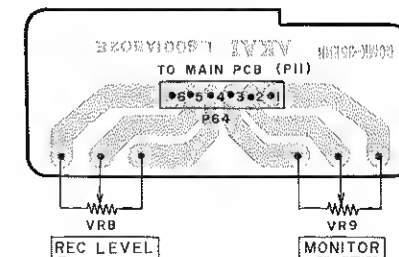
VOLUME (1) PCB L600IA502C



VOLUME (2) PCB L600IA502D



VOLUME (3) PCB L600IA502E



SECTION 5

SERVICE BULLETIN

- This section describes the information on techniques, revisions and troubleshooting for servicing and adjusting S612.
- To maintain the performance of S612, see also S612 Service Manual for servicing and adjustment.
- Further technical information will be issued as any arises.
Keep such information carefully under the name of this file.

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MODEL : S612

INDEX

Bulletin No.	Subject No.	Description
S612/1	001	Improvement of Manual Splice Setting
	002	Improvement of Power IC insulation
	003	Improvement of Sound Quality
	004	Deletion of Cassette P.C. Board
	005	Distortion countermeasure

MODEL: S612

No. S612/1

DATE: August 1985

001 Subject: To improve performance

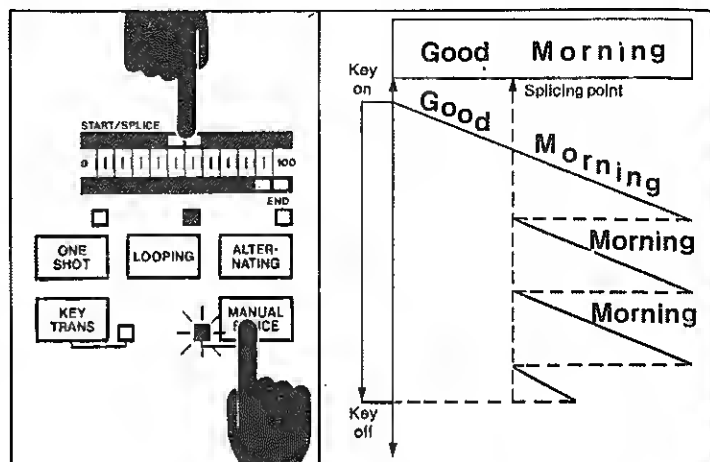
In order to make it easy to set a splice point in Manual Splice operation in Looping or Alternating modes, the program version of ROM IC TMM2764D in Main P.C. Board has been changed from V1.0 to V1.1.

	Ref. No.	Part No.	Description
(PREV.)	2-IC3	EI-359608	IC TMM2764D S612 CUSTOM
(NEW)	2-IC3Z	EI-362112	IC TMM2764D S612 V1 CUSTOM

NOTE : Accordingly, the Operator's Manual has been changed as follows.

Manual Splice Mode

The S612 normally sets up a splicing point by using the automatic splicing system. However, by pressing the **MANUAL SPICE** button, the automatic splicing system will be overridden, which makes it possible for you to set a splicing point manually. In this situation, the **START/SPICE** lever's function is to set a splicing point and by adjusting this lever, a different splicing point may be set. Also, the **END** lever gives a fine adjustment of the splice, and pressing the **LOOPING** (or **ALTERNATING**) button will advance the splice point by one. Eight presses will return to the point set by the levers. For example, in the **LOOPING** mode, when the **MANUAL SPICE** button is pressed and the splicing point is set at "Morning" by the lever, a key-on starts the phrase "Good Morning". After the phrase is played once, "Morning" will be repeated until the key-off.



Changed from : Middle of June 1985
Service Ref. No. : CNL0051

MODEL: S612

No. S612/1

DATE: August 1985

002 Subject: To improve reliability

In order to prevent short-circuiting of Power regulator IC in Power Supply P.C. Board, the insulator has been changed as follows.

	Ref. No.	Part No.	Description
(PREV.)	5-1	EZ-200473	SILICON RUBBER SHEET TC-30
(NEW)	5-1Z	EZ-345459	TRANSISTOR SUPPORT BFG-20TO-3P

Changed from : July 1985
Service Ref. No. : CNA0639

MODEL: S612

No. S612/1

DATE: August 1985

003 Subject: To improve performance

In order to prevent noise or distortion in sound when a chord is played, the register value in Main P.C. Board has been changed as follows.

Ref. No.	Prev.	New
2-R105	10K	2K CB

Changed from : July 1985
Service Ref. No. : CNA0763

MODEL: S612

No. S612/1

DATE: August 1985

004 Subject: Costdown purpose

Because of the unfavorable popularity of Commodore type cassette data recorder, Cassette P.C. Board has been eliminated. Accordingly, Rear Panel has been changed to a new one without on opening for cassette connector.

	Ref. No.	Part No.	Description
(PREV.)	1-3	BA-L6001A080A	P.C. CASSETTE BLKS612 (C)
(NEW)	DELETED		
(PREV.)	16-7B	SP-355494B	PANEL REAR S612 (C, A)
(NEW)	16-7BZ	SP-355494E	PANEL REAR (2) S612 (C, A)
(PREV.)	16-7C	SP-355494D	PANEL REAR S612 (E, V, B, S)
(NEW)	16-7CZ	SP-355494F	PANEL REAR (2) S612 (E, V, B, S)
(PREV.)	16-10	BC-355499	COVER CASSETTE
(NEW)	DELETED		

Changed from : July 1985
Service Ref. No. : CNA0782, CNL0057,

MODEL: S612

No. S612/1

DATE: August 1985

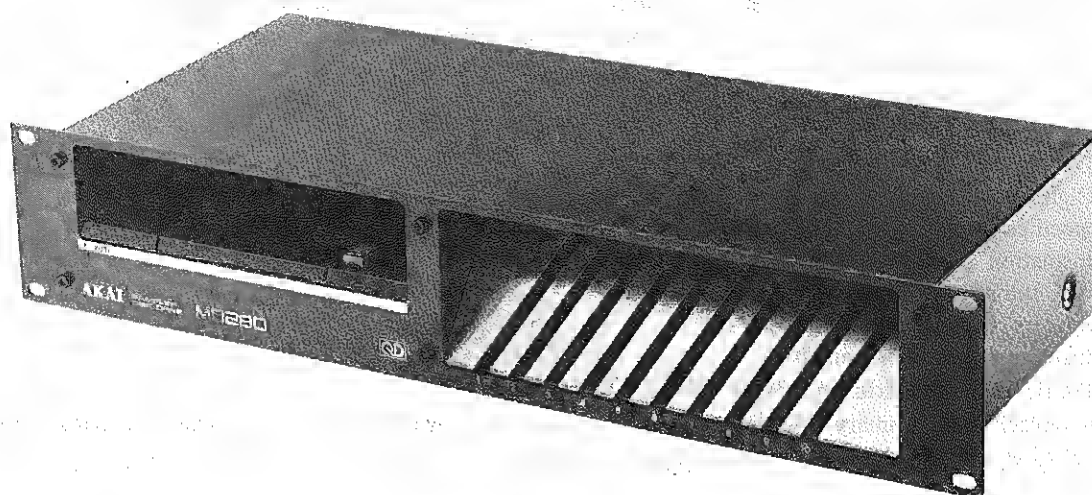
005 Subject: Trouble countermeasures

Symptom : Sound distorts when sampled at maximum level.
Countermeasure : The value of registers in Main P.C. Board and Power supply P.C. Board have been changed as follows.

Ref. No.	Prev.	New
2-R98	270	430 CB
2-R118-123	27K	51K CB
2-R126-131	2.4K	4.3K CB
5-R7	3.9K	2.7K CB

NOTE : When replacing a new type Main P.C. Board into an old type unit, be sure to modify Power Supply P.C. Board for proper function.

Changed from : August 1985
Interchangeability : Not interchangeable
Service Ref. No. : CNA0703, CNA0783, CNA0810



SAMPLER DISK DRIVE

MODEL MD280

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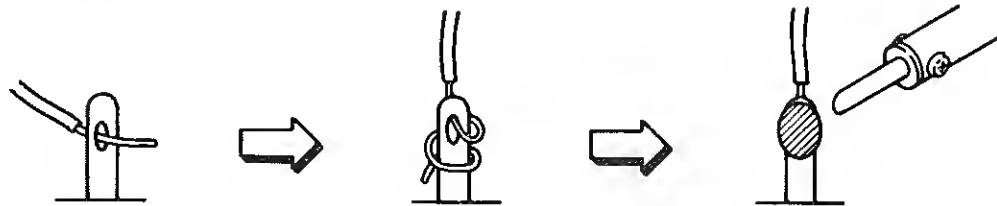
SAFETY INSTRUCTIONS

SAFETY CHECK AFTER SERVICING

Confirm the specified insulation resistance between power cord plug prongs and externally exposed parts of the set is greater than 10 Mohms, but for equipment with external antenna terminals (tuner, receiver, etc.) and is intended for **C** or **A**, specified insulation resistance should be more than 2.2 Mohms (ground terminals, microphone jacks, headphone jacks, line-in-out jacks etc.)

PRECAUTIONS DURING SERVICING

1. Parts identified by the **Δ** symbol parts are critical for safety.
Replace only with parts number specified.
2. In addition to safety, other parts and assemblies are specified for conformance with such regulations as those applying to spurious radiation. These must also be replaced only with specified replacements.
Examples: RF converters, tuner units, antenna selector switches, RF cables, noise blocking capacitors, noise blocking filters, etc.
3. Use specified internal wiring. Note especially:
 - 1) Wires covered with PVC tubing
 - 2) Double insulated wires
 - 3) High voltage leads
4. Use specified insulating materials for hazardous live parts. Note especially:
 - 1) Insulation Tape
 - 2) PVC tubing
 - 3) Spacers (Insulating Barriers)
 - 4) Insulation sheets for transistors
 - 5) Plastic screws for fixing microswitch (especially in turntable)
5. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.), wrap ends of wires securely about the terminals before soldering.



6. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.).
7. Check that replaced wires do not contact sharp edged or pointed parts.
8. Also check areas surrounding repaired locations.
9. Use care that foreign objects (screws, solder droplets, etc.) do not remain inside the set.

SECTION 1 SERVICE MANUAL

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I. SPECIFICATIONS

Memory capacity	1 voice per side (128 KByte, A and B side)
Track	1 track (Spiral)
Recording media	2.8" sampler disk
Life of media	2,000 path
Operating temperature	10°C to 35°C
Operating humidity	20% to 80% (No moisture condensation)
Power requirement	DC 8V (Power supplied from Akai S612)
Power consumption	8.0W (max.)
Front panel	EIA 2U standard size
Dimensions	482.6 (W) × 88.1 (H) × 205 (D) mm (19.0 × 3.5 × 8.1 inches)
Weight	3.7kg (8.1 lbs)

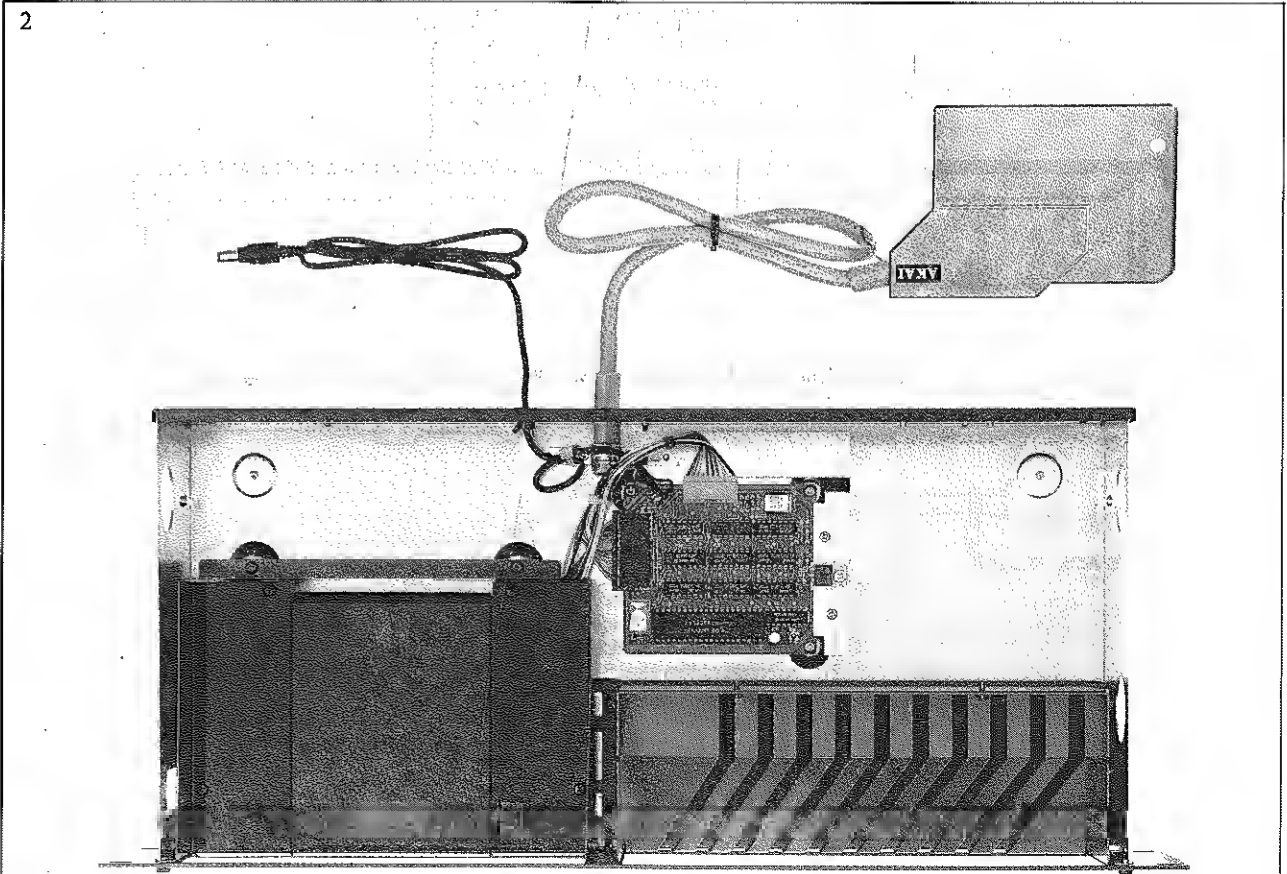
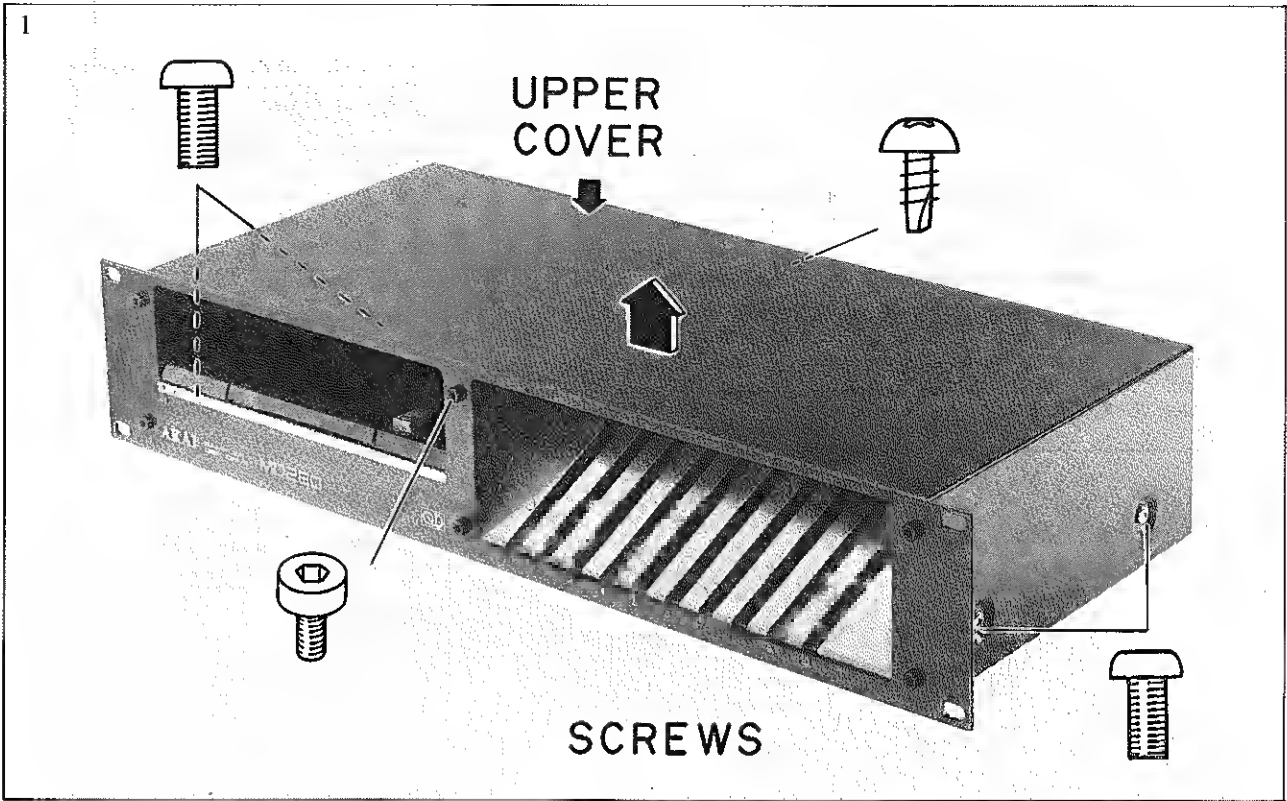
(Standard accessories)

- Replacement felt pad..... 1
- Cotton swab 1

* For improvement purposes, specifications and design are subject to change without notice.

II. DISMANTLING OF UNIT

In case of trouble, etc. necessitating dismantling, please dismantle in the order shown in the photographs.
Reassemble in reverse order.



III. CONTROLS

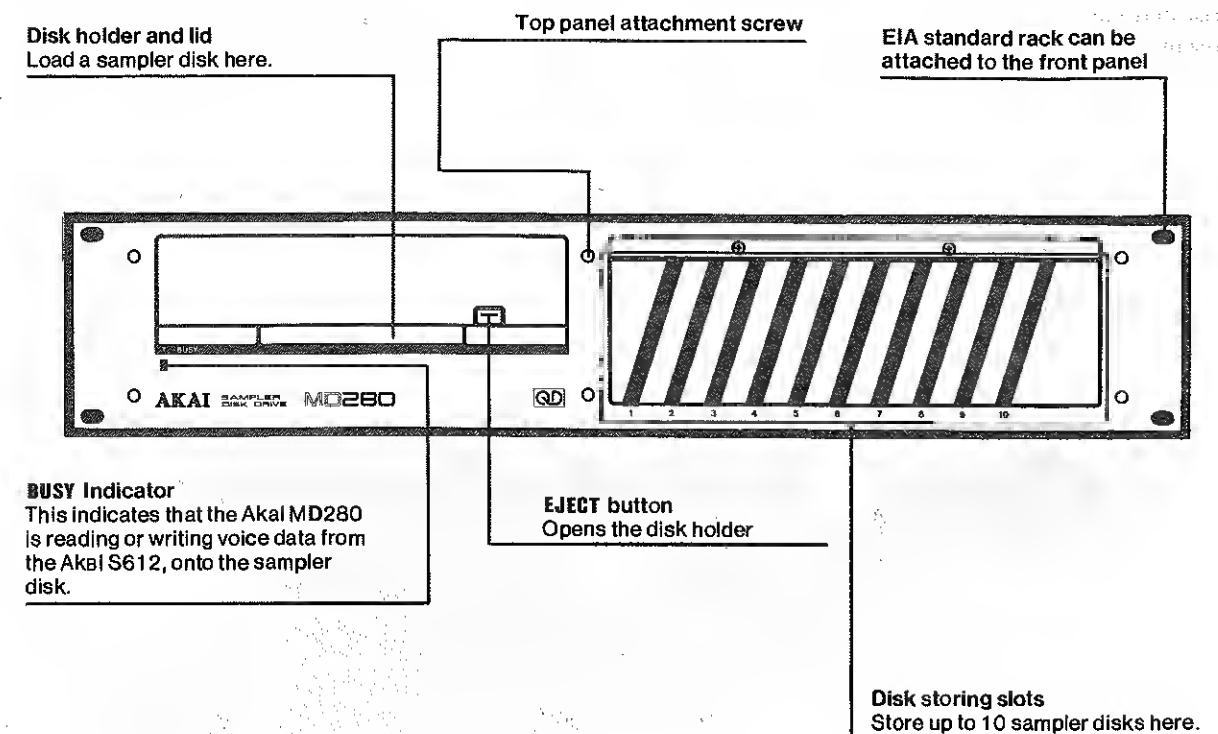


Fig. 3-1. Front View

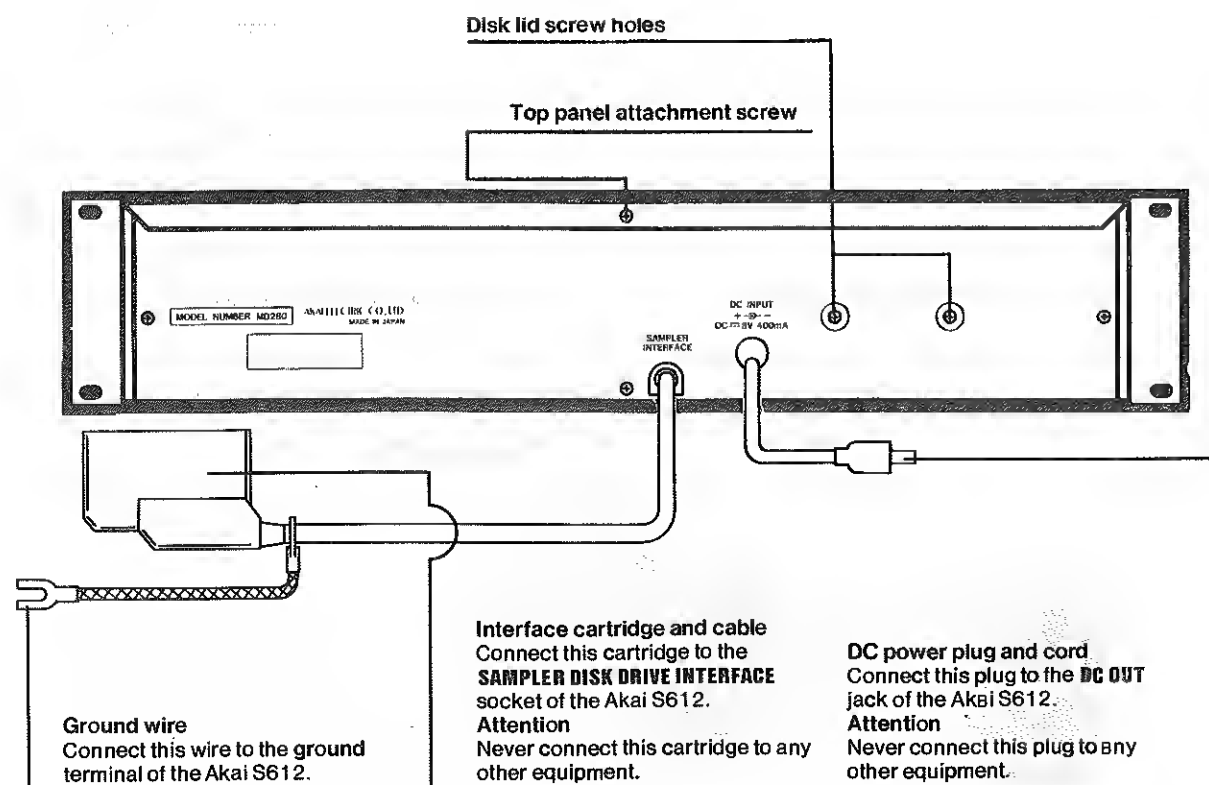


Fig. 3-2. Rear View

IV. PRINCIPAL PARTS LOCATION

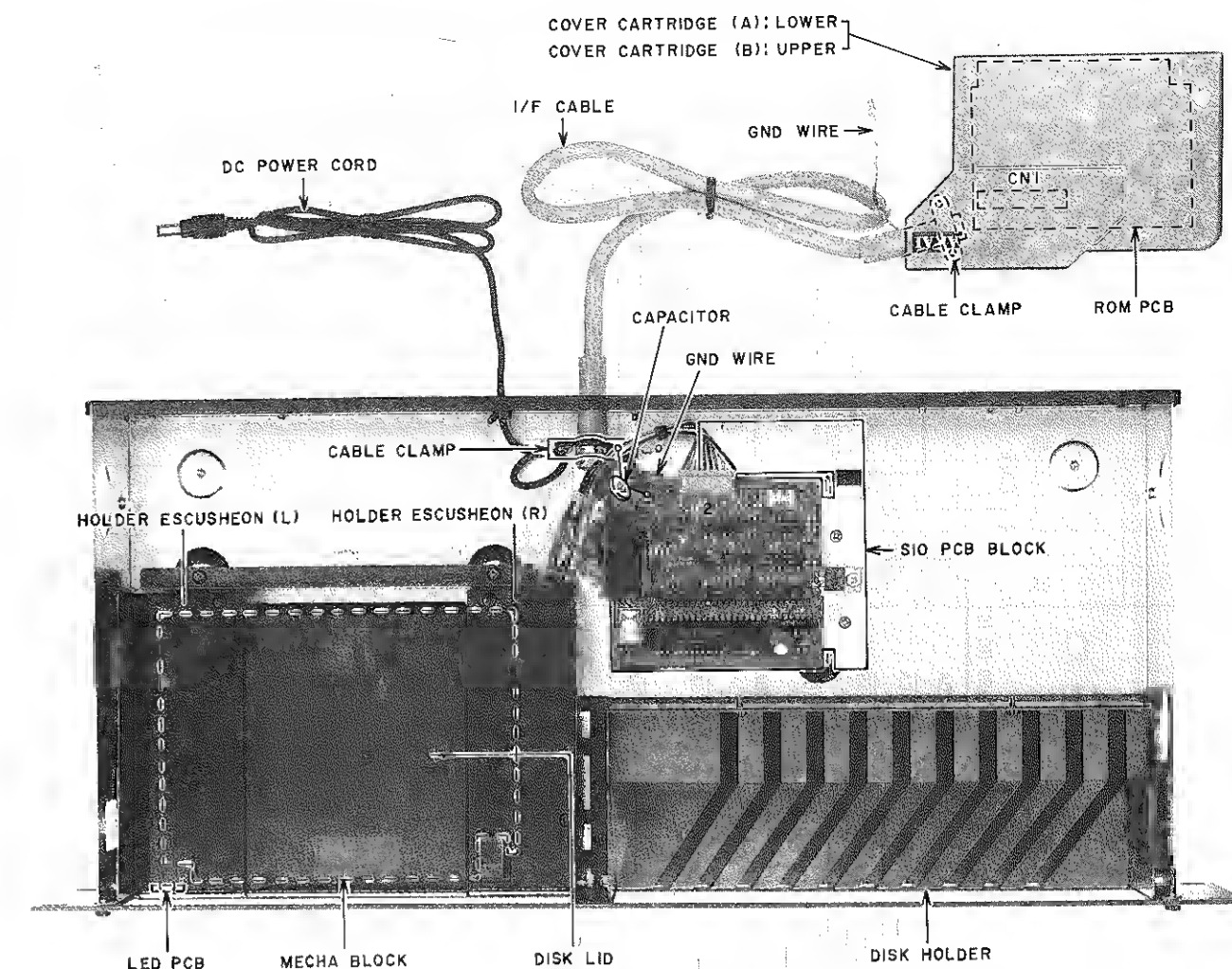
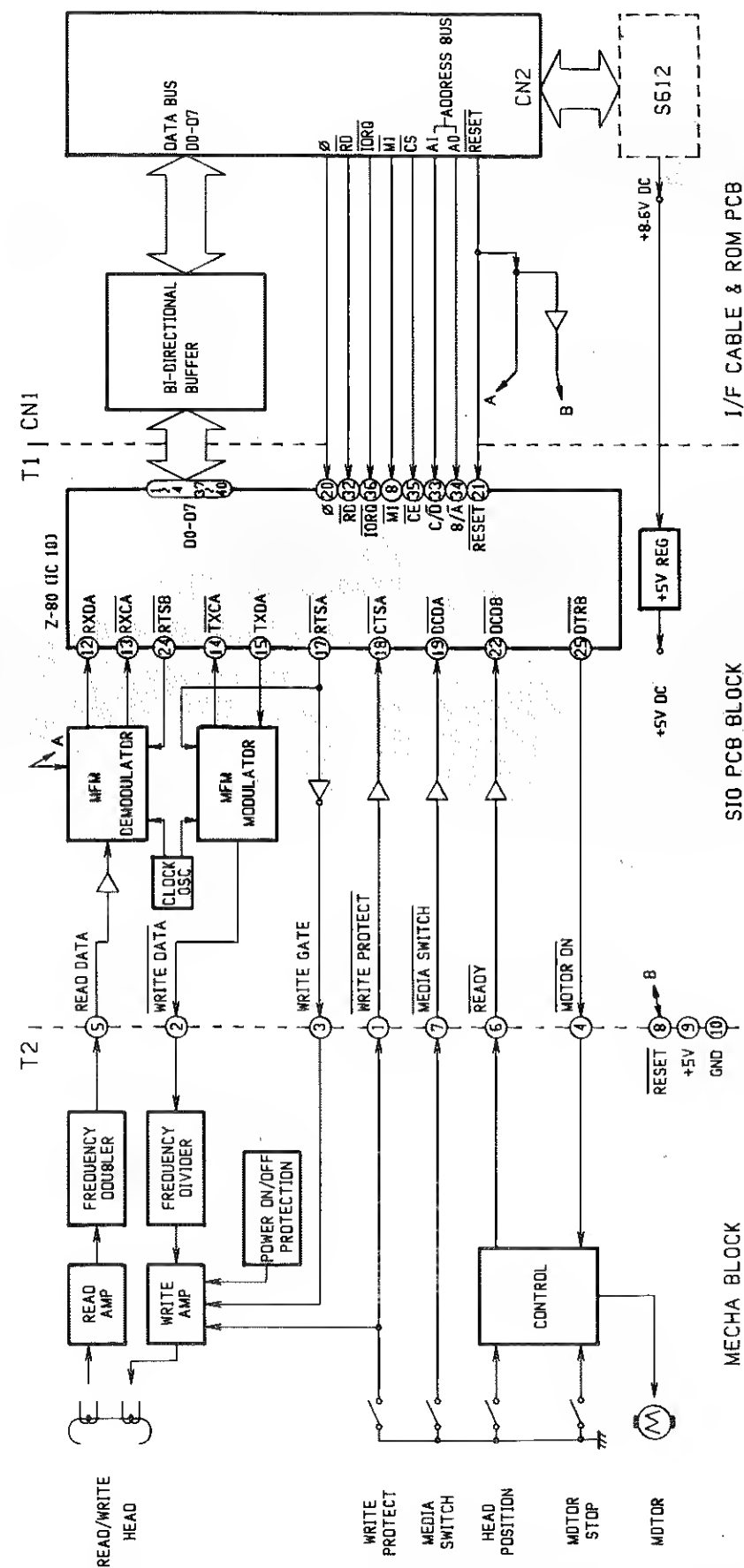


Fig. 4-1.

V. OPERATION DESCRIPTION

5-1. MD280 SYSTEM BLOCK DIAGRAM



5-2. SIGNAL AND TERMINAL NO. FOR EACH SIGNAL LINE

- 1) Signal line (1): Digital Sampler S612 CN2 I/F Circuit (ROM PCB)
- 2) Signal line (2): I/F circuit (ROM PCB) CN1/T1 SIO PCB

Parts side		Pattern side	
Terminal No.	Signal	Terminal No.	Signal
1	CS1	2	—
3	—	4	STLSL
5	—	6	—
7	—	8	—
9	M1	10	—
11	—	12	MERQ
13	WR	14	RD
15	RESET	16	—
17	A9	18	—
19	A11	20	A10
21	A7	22	A6
23	A12	24	A8
25	—	26	A13
27	A1	28	A0
29	A3	30	A2
31	A5	32	A4
33	D1	34	D0
35	D3	36	D2
37	D5	38	D4
39	D7	40	D6
41	GND	42	CLOCK
43	GND	44	SW1
45	+5V	46	SW2
47	+5V	48	—
49	—	50	—

Terminal No.	Signal	Terminal No.	Signal
1	+5V	2	GND
3	D7	4	GND
5	D6	6	GND
7	D5	8	GND
9	D4	10	GND
11	D3	12	GND
13	D2	14	GND
15	D1	16	GND
17	D0	18	RESET
19	CS	20	A1
21	RD	22	A0
23	IORQ	24	φ
25	M1	26	GND

3) Signal line (3): SIO PCB T2 Mecha Block (QD)

Terminal No.	Cable Color	Signal	Terminal No.	Cable Color	Signal
1	BRN	WRPR	2	RED	WRDT
3	ORG	WRGA	4	YLW	MTON
5	GRN	RDDT	6	BLU	READY
7	VLT	MDST	8	GRY	RESET
9	WHT	+5V	10	BLK	GND

5-3. OPERATION DESCRIPTION

1) General

● The MD280 recording track has been arranged spirally from the outer periphery of a disk to the inner (in a single track), and data read/write operations will invariably be started at the outer periphery of a disk (the disk top).
(In a non-operative mode of the mechanical block, the head will always remain at a standstill at the inner periphery of a disk, i.e. the disk end.)

● When in the above state, S612 issues an operating command to the mechanism block, not only will the disk start revolving, but the head will also be shifted rapidly by a cam from the inner periphery to the outer in an initial mode of operation. The head will then be shifted along the recording track from the outer periphery toward the inner, performing either read or write operations in the interim. This shifting will also be made by a cam.
In addition, for the duration when the head is shifted by the motor, an LED ("BUSY") will turn on regardless of whether or not read/write operations are performed in the interim.

2) I/F Circuit

1. Bidirectional Buffer

Not only minimizes influences to the input circuit, but also strengthens drive capabilities for the output circuit.

3) SIO Circuit

1. Bidirectional Buffer

When \overline{CE} has been made "L", enables data transfers, and with \overline{RD} signals, varies the data input/output relations.

2. SIO

● Channel A chiefly performs the serial-parallel as well as parallel-serial conversions of data, and at the same time, also generates CRC that is required for data error checks.

Channel B serves only for QD control input/output signals.

● By its program, SIO performs not only the serial conversion of parallel data and the parallel conversion of serial data, but also the input/output of control signals. Presented below are the individual signals that will be employed for both the channels, A and B, of SIO.

a. \overline{CE} , B/\overline{A} , and C/\overline{D}

These signal serve for switching the SIO enable, channel select, and data control operations.

\overline{CE}	B/\overline{A} (SO)	C/\overline{D} SI	SIO REGISTER
0	0	0	SIO Channel A DATA
0	1	0	SIO Channel B DATA
0	0	1	SIO Channel A CONTROL
0	1	1	SIO Channel B CONTROL
1	-	-	SIO Not Select

b. Channel A Input/Output Signals

\overline{CTSA} (Input):

An input to \overline{WRPR} (Write Protect) of QD that when "H", inhibits recording (write) operations, and when "L" enables recording (write) operations.

\overline{RTSA} (Output):

An output to \overline{WRGA} (Write Gate) of QD that when "L", turns \overline{WRGA} ON (makes \overline{WRGA} "H"), and enables write operations by QD and a clock output to \overline{TXCA} .

\overline{DCDA} (Input):

An input to \overline{MDST} (Media Set) of QD that will indicate the medium to have been set when the MEDIA SW output of QD is "L".

\overline{TXDA} (Output):

A transmitting data output.

\overline{TXCA} (Input):

The clock for transmission (101.5625 kHz).
Transmitting data (\overline{TXDA}) will be sampled at down-going edges of this clock, for output.

\overline{RXDA} (Input):

A received data input.

\overline{RXCA} (Input):

The clock for reception.
Received data (\overline{RXDA}) will be sampled at down-going edges of this clock, for fetching by SIO.

c. Channel B In/Output Signals

\overline{DTRB} (Output):

A motor-on (\overline{MTON}) output to QD.
The motor is switched on at a down-going edge "H" \rightarrow "L" of this signal, and will be switched off when this signal is "H" and a motor stop point of QD has been reached.

\overline{DCDB} (Input):

A \overline{READY} input from QD.
Read/write operations will commence at a down-going edge of this signal.

\overline{RTSB} (Output):

A signal output for switching the MFDemodulator VFO operation on/off.
The operations will be switched off when this signal is "H" (and \overline{RXCA} and \overline{RXDA} will be fixed at "H" and "L" levels, respectively). This signal is used for excising bit synchronization on MFDemodulator.

4) MFM (Modified Frequency Modulation) Modulator
Modulates the data that has been serial-converted by SIO, in conformance with the MFM recording format.

5) MFM Demodulator

Demodulates the read data that has been MFMModulated, into the usual serial data.

6) Clock Oscillator

Generates the clock pulses that will be required for MFMModulating and MFDemodulating operations.
The original quartz oscillation is at 6.5 MHz.

7) QD Control Circuit

1. Write amplifier

Drives the current for flowing through the head to write data.

The write operation may also be inhibited with an external signal ("WRITE PROTECT") or ("WRITE GATE").

2. Read Amplifier

Amplifies and differentiates the input voltage picked up by the head, and by passing it through a zero-cross comparator, will convert it to a signal waveform at logic levels in correspondence to flux reversal positions on the medium.

3. Motor Controller

Serves for controlling the rotary speed and speed-torque characteristics of the motor, by increasing the current flowing through the motor when at an increased motor load, and will not only enhance the speed-torque characteristics of the motor above its bare characteristics, but also suppress the effect of power supply voltage fluctuations.

4. Digital Converter

By inputting signals from the read amplifier, converts them to a signal that will enable the SIO circuit to distinguish the data (read data). The frequency will be doubled by the process.

5. Frequency Divider

Divides the write data signal into half the frequency.

(Reverses the direction of a write current in the head, and distributes flux reversals on the medium in correspondence to the write data.)

6. Power-on/off Protector

Blocks the write current against flowing when the power supply voltage has varied (fluctuated) below a predesignated level or when power has been switched on or off.

7. The Head Position switch serves for detecting the outermost periphery of a medium, and read/write operations commence at a down-going edge of its signal.

8. The Motor Stop switch serves for detecting the motor stopping position, and when during write operations, the head has reached the motor stopping position, the motor will be stopped even if the $\overline{MOTOR ON}$ signal had been held "L".

9. Individual QD Drive signals

\overline{WRDT} :

A disk writing data transferred from the SIO PCB to the QD drive, that will be used together with \overline{WRGA} when writing data.

\overline{WRGA} :

An "H" level of this signal engaged from the SIO side enables disk write operations.

\overline{RDDT} :

A data signal that has been waveform-shaped into pulses out of the analog signal read out from a disk.

\overline{READY} :

This signal will be made "L" at the timing when disk read or write operations are enabled.

\overline{MDST} :

A medium detecting signal that will be made "L" when a medium has been set.

\overline{WRPR} :

A medium write protect signal that will be made "L" when a medium with the write protection tab that has not been broken out is set.

\overline{MTON} :

A motor-on/off control signal.
As this signal is made "L", the motor will be turned and read or write operations enabled.

\overline{RESET} :

When this signal is made "L", the SIO and QD circuits will be initialized. If in the process, the motor has been turning, it will be stopped compulsorily and the \overline{READY} signal made "H".

10. Timings for Individual QD Drive Signals

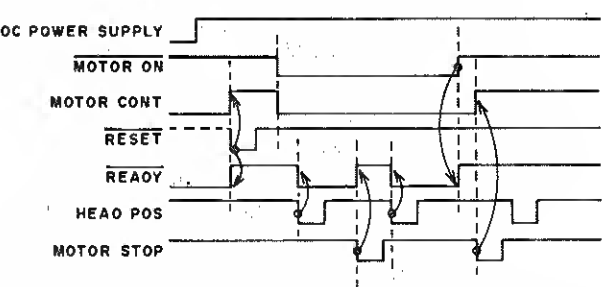


Fig. 5-2 Control Timing

● A down-going edge of the Head Position signal causes \overline{READY} to be made "L", at which timing, read/write operations will commence.

● A down-going edge of the Motor Stop Position signal causes \overline{READY} to be made "H". If at this timing, \overline{MTON} has already been made "H", the motor will be made to stop. Even when \overline{MTON} has been "L", if \overline{WRGA} is "H", (a write mode), the motor will similarly be made to stop.

● Requirements for \overline{READY} signal to be made "H": An "L" level of \overline{RESET} , a down-going edge of the Motor Stop Position signal, or an up-going edge of \overline{MTON} . Requirements for the \overline{READY} signal to be made "L": An down-going

VI. MAINTENANCE

6-1. CAUTION

- 1) The Akai MD280 has been designed exclusively for use with the Akai S612 Digital Sampler. Never connect any other equipment to the MD280.

- 2) Make sure to turn off the Akai S612 before connecting the Akai MD280.

- 3) On the Protection card

The protection card installed inside of the disk holder of the Akai MD280 is to protect the mechanical parts from damage during transportation.

Before loading a sampler disk into the Akai MD280, remove this protection card from the disk holder.

When transporting the Akai MD280 over a long distance, be sure to insert this protection card inside of the disk holder again.

- 4) Interface cartridge and cable

Connect this cartridge to the SAMPLER DISK DRIVE INTERFACE socket of the Akai S612.

Never connect this cartridge to any other equipment.

- 5) DC power plug and cord

Connect this plug to the DC OUT jack of the Akai S612.

Never connect this plug to any other equipment.

- 6) Ground wire

Connect this wire to the ground terminal of the Akai S612.

- 7) Removing a sampler disk

Never depress the EJECT button when the BUSY indicator is lit, (i.e. during SAVE, VERIFY or LOAD functions).

Never touch the magnetic sheet, as dust and scratches may cause data error.

- 8) The Akai MD280 is controlled by the S612. Therefore, the MD280's operations consist only of loading and unloading of sampler disks.

- 9) When writing (saving) voice data onto the sampler disk with the Akai MD280, the written (saved) voice data is not interchangeable for use with any other personal computers.

- 10) Write protection tabs (one each for sides A and B)

If these tabs are not broken, the read/write head can read (LOAD/VERIFY) or voice data can be written (saved) onto a sampler disk. When the write protection tabs are broken, the MD280 can read voice data from the sampler disk, but it cannot write (SAVE) voice data onto the sampler disk. If you want to write again after the tabs have been broken, cover them with adhesive tape.

- 11) When connecting both the Akai MD280 and a COMMODORE type data recorder to the Akai S612, the Akai MD280 takes priority over the COMMODORE type data recorder during read/write operations. However, if the sampler disk's write protection tabs are broken, the connected COMMODORE type data recorder will operate writing voice data but the Akai MD280 will not operate.

- 12) If "E" (Error) is displayed on the Akai S612's MIDI CH. display during operation:

- * The read/write head is dirty.
- * The felt pad is worn out.
- * The sampler disk is of poor quality, worn out, etc.

If a dirty head or worn out felt pad are the cause of malfunction, clean the read/write head or replace the felt pad. Refer to "Maintenance II" on page 13.

If the sampler disk is the cause, replace the sampler disk with a new one.

- 13) Do not turn the flywheel in the opposite direction indicated with arrow on the flywheel, as it may damage the cams in the mechanism block.

6-2. MAINTENANCE I

Cleaning of the read/write head (Refer to Fig. 6-1)

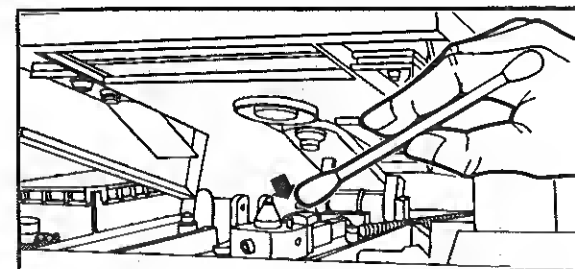


Fig. 6-1

- 1) A dirty head cannot read and write data onto the sampler disk properly, and may also cause the Akai S612 to malfunction. Please clean the read/write head of the Akai MD280 periodically.
- 2) Depress the EJECT button to open the disk holder. Use a liquid cleaner exclusively made for tape decks.
- 3) Never touch the read/write head with your fingers, it may cause malfunctions.

6-3. MAINTENANCE II

Replacing the felt pad (Refer to Figs. 6-2 to 6-5)

- 1) When the felt pad is worn out, the MD280 cannot perform read (LOAD, VERIFY) and write (SAVE) operations properly. During SAVE, VERIFY or LOAD operations, if malfunctions occur after you have cleaned the read/write head, replace the felt pad with a new one.

- 2) Before replacing the felt pad

Make sure to disconnect the Akai MD280 from the S612 and remove the Akai MD280 from the EIA rack, if attached.

- 3) Remove the MD280's upper cover

1. Remove the 4 screws on the left and right side panels (2 each) of the Akai MD280.
2. Remove the screws from the front and rear panels (1 screw each for both front and rear panels).
3. Remove the upper cover of the Akai MD280.

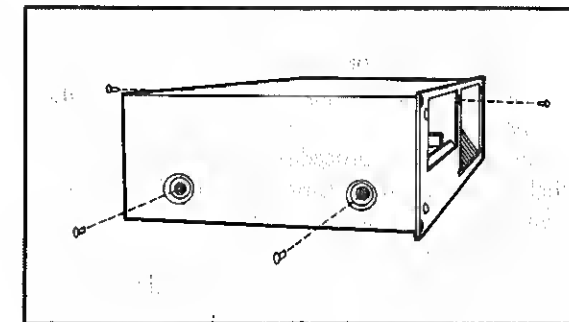


Fig. 6-2

- 4) Remove the disk lid

1. Remove the 2 screws which secure the disk holder. Insert a screwdriver into the 2 holes on the rear panel. Make sure the cassette holder is closed when removing the screws.
2. Remove the lid from the disk holder.

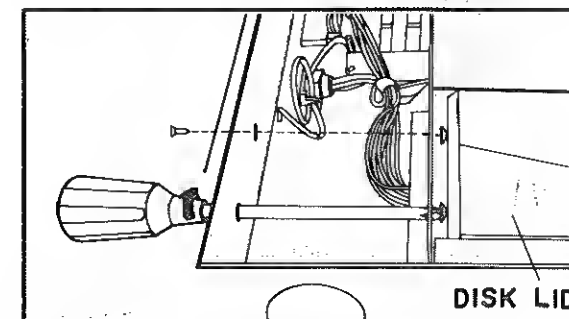


Fig. 6-3

- 5) Remove the felt pad

1. Turn the felt pad clockwise, about 90 degrees, (1/4 turn).
2. Pull up on the felt pad holder, then remove the felt pad from the holder.

Hold your finger on the felt pad holder to keep it open until you have attached the new felt pad.

Akai recommends cleaning the read/write head at the same time you are replacing the felt pad.

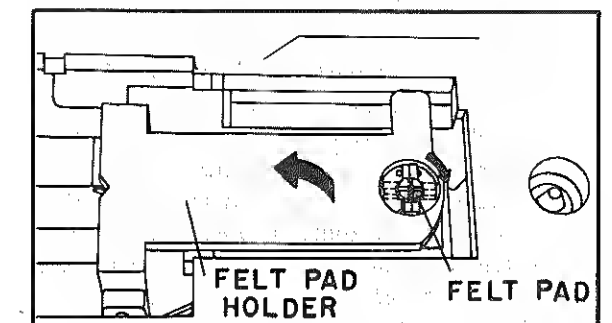


Fig. 6-4

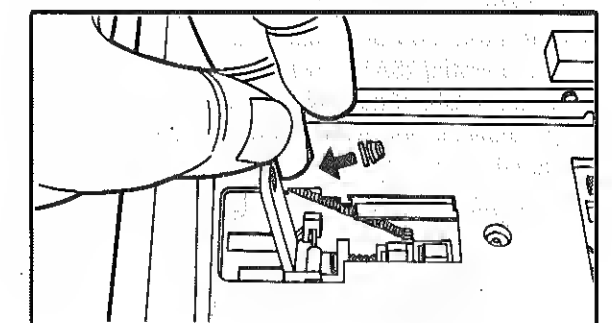


Fig. 6-5

- 6) Attach the felt pad

1. Attach the new felt pad to the felt pad holder, then turn the felt pad clockwise about 90 degrees, (1/4 turn). To securely attach the felt pad, a tweezer should be used.
2. After attaching the felt pad to the felt pad holder, replace into place gently. Never touch the read/write head and the felt part of the felt pad with your fingers.

- 7) Reattach the disk lid and the upper cover

1. Reattach the 2 screws which secure the disk holder.
2. Reattach the upper cover to the Akai MD280 with the 6 screws (1 screw each for the front and the rear panels, 2 screws each for the left and right sides of the upper cover).

VII. TROUBLESHOOTING

7-1. THE FOLLOWING DEVICES AND MEDIA ARE REQUIRED FOR THE TROUBLESHOOTING OF MD280.

- * Digital Sampler S612
- * Test Media (A) MD280 (Parts No.: AT-751375)
- * Disk Drive Unit BLK. (Parts No.: BB-360748)
This block is composed of Mecha BLK, SIO PCB BLK and I/F BLK (I/F cable + ROM PCB + CARTRIDGE COVER)
- * Digital Voltmeter
- * Desoldering Tool (HAKKO ACE No. 48I etc.)
- * Oscilloscope (or storage-oscilloscope)

7-2. BEFORE THE TROUBLESHOOTING

The MD280 is always used with the Digital Sampler S612 and it is also executed by the operation of the S612. For the reason, if some troubles are occurred under the execution of the MD280, the engineer must determine whether the trouble is occurred by the MD280 or S612. The determination is performed by using the S612 and the test media for operation. Before the process, the following basic items must be checked. (Of course, even if the S612 shows a correct operation, the following items should be checked.)

- 1) Disk is incorrectly inserted.
Refer to the operator's manual and insert the disk correctly.
- 2) Write protection tab is removed.
The re-writing (SAVE) will not be performed without the above tab. If the re-writing is required, perform it by sealing the hole with adhesive tape etc. as shown in Fig. 7-1.

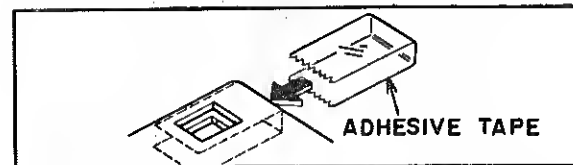
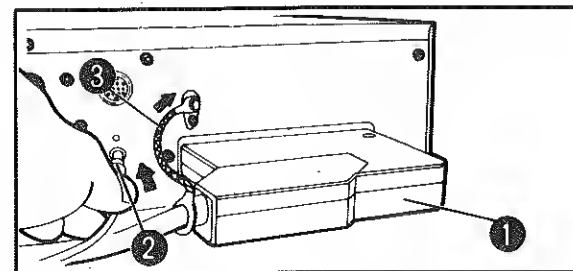


Fig. 7-1

- 3) The MD280 is not correctly connected with the S612.
Refer to the operator's manual (or Fig. 7-2) and perform the right connection.



- ①: CARTRIDGE
- ②: DC INPUT
- ③: GND WIRE

Fig. 7-2

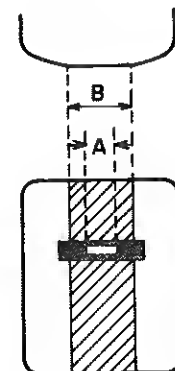
- 4) Disk's scratches, damages or expiration of lifetime.
By inserting a new disk into the MD280 and executing SAVE/VERIFY/LOAD, or by inserting a test media into the MD280 and executing "LOAD", the determination can be performed.
Replace it with a new disk if necessary.
- 5) Dirty head.
Refer to the head cleaning method as shown in the Maintenance I (page 12) and perform the cleaning.
- 6) Felt Pad's inferiority or lifetime expiration.
The determination can be performed by replacing the felt pad with a new one.
Refer to the replacement method of the felt pad as shown in the Maintenance II (page 13) and perform the replacement of felt pad.

Note: Lifetime expiration of head

If the head had been used very frequently or long time, the expiration of head lifetime caused by wearing would be considered.

Confirm the wearing condition by the following procedure:

- a) Using the same procedure as the head cleaning, slightly pull up the felt pad holder and visually confirm the wearing condition of head.
- b) As shown in the Fig. 7-3, if the width of worn surface is wider than the width of core, the lifetime expiration of head would be considered. Consider that the standard width of rub-out surface is over 2mm.



A: Core width
B: rub-out surface width
Head lifetime: $A < B$ (over 2mm)

Fig. 7-3

- c) The lifetime expiration of head can be determined by measuring the output level (more than 400mVp-p) of storage-oscilloscope which is connected to the test point (Tp1) on the SUB PCB. Anyway, if the head lifetime is expired, the mecha (mechanism) block must be replaced. Accordingly, replace the mecha block referring to the mecha block replacement method (page 21).

7-3. TROUBLESHOOTING PROCEDURE

- 1) Firstly, determine whether the trouble is caused by the MD280 or S612 by the following method described below:

1. Connect the MD280 with the S612 and then switch the power on (must confirm if the connection is surely connected or not).
2. Insert the test media into the MD280 and execute "LOAD" by pressing the "LOAD" button of the S612.
3. At this time, the MIDI CH display of the S612 indicates "d." (data). Confirm the subsequent indications.
4. When "E." (Error) is indicated, the MD280 has some trouble.
item 7-2, 1) ~ 6) or the flowchart of troubleshooting.
5. When "c." (check) is indicated, reconfirm the connection of the MD280 and S612 and the insertion of test media. After the reconfirmation, if the "c." is still indicated, the MD280 has some trouble.
6. When "B." (Omni-on) is indicated, "LOAD" has been executed.
Then, execute "VERIFY" by pushing the "VERIFY" button. When "G." (Good) is indicated after the execution of "VERIFY", the MD280 has no trouble.
(If required, perform the troubleshooting of the S612 by referring the S612 service manual).
When "E." is indicated, the MD280 has some trouble. Perform the troubleshooting and repairment by referring to the item 7-2, 1) ~ 6) or the flowchart of troubleshooting.
7. If there is no indication appeared on the MIDI CH display of the S612 and also the MD280 can not be operated even through the "LOAD" button of the S612 has been pressed, perform the troubleshooting by replacing the three blocks with the other three blocks which are properly operation.

If there is no indication even if the above process has been performed, it would be considered that the S612 has some trouble. In this case, refer to the S612 service manual and perform the repairment of the S612.

Note: The following symptoms may occur when connection or disconnection of the MD280 interface cable is made while the power of the S612 is on.

1. None of operation buttons is acceptable.
2. No character is displayed on the MIDI CH display.
3. Abnormal character is displayed on the MIDI CH display.
4. No MIDI signal is received.

In this case, turn off the power of the S612 and turn it on again to reset the unit.

If the symptoms still exist, turn off the S612 and disconnect the MD280 from the S612 and see if the S612 works properly by itself.

Followings are the possible causes on the MD280 of above symptoms.

1. Bridge within the I/F cable.
2. Bridge on the SIO PCB's pattern.
3. Faulty IC's on the SIO PCB.

- 2) Troubleshoot according to the symptom referring to the flow chart (1) to (4) shown on page 17 to 20.

3) Block Replacement

The troubleshooting of MD280 is unlike the case of other general audio video devices. It employs the "block replacement" method as the basic troubleshooting method. And the supply parts are supplied by each block unit as a general principle.

The MD280 is composed of three blocks as indicated in the above item 7-1.

Accordingly, when the troubleshooting is required, a set of each block (a set of Disk Drive Unit BLK MD280) should be prepared to simplify the troubleshooting. Then as the basic troubleshooting process, each block is replaced, any incorrect block is determined and the repairment is performed.

Refer to Replacement Method of Each Block on page 21.

7-4. TROUBLESHOOTING FLOW CHART AND CHECK POINT

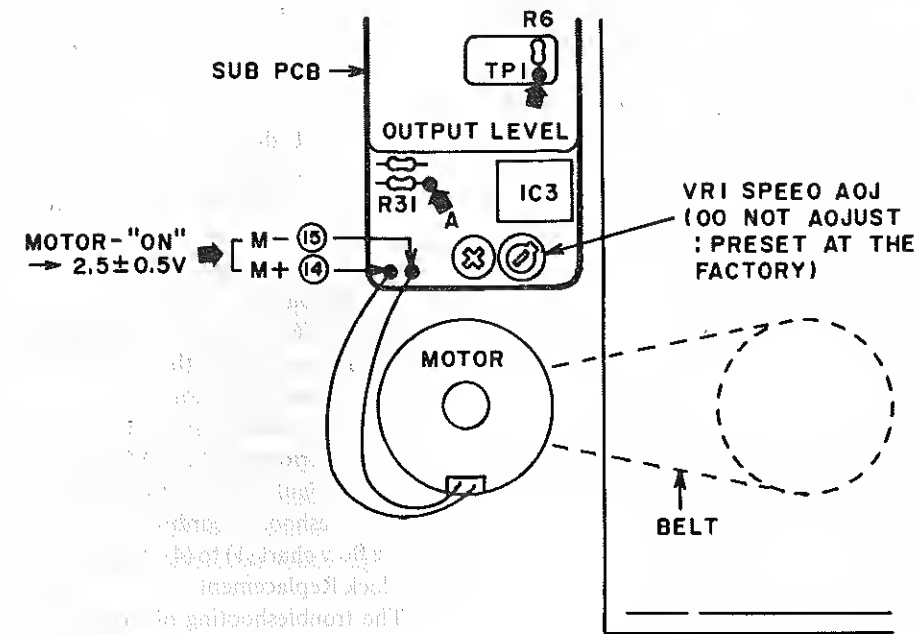


Fig. 7-4 Mecha Block Check Point for Troubleshooting

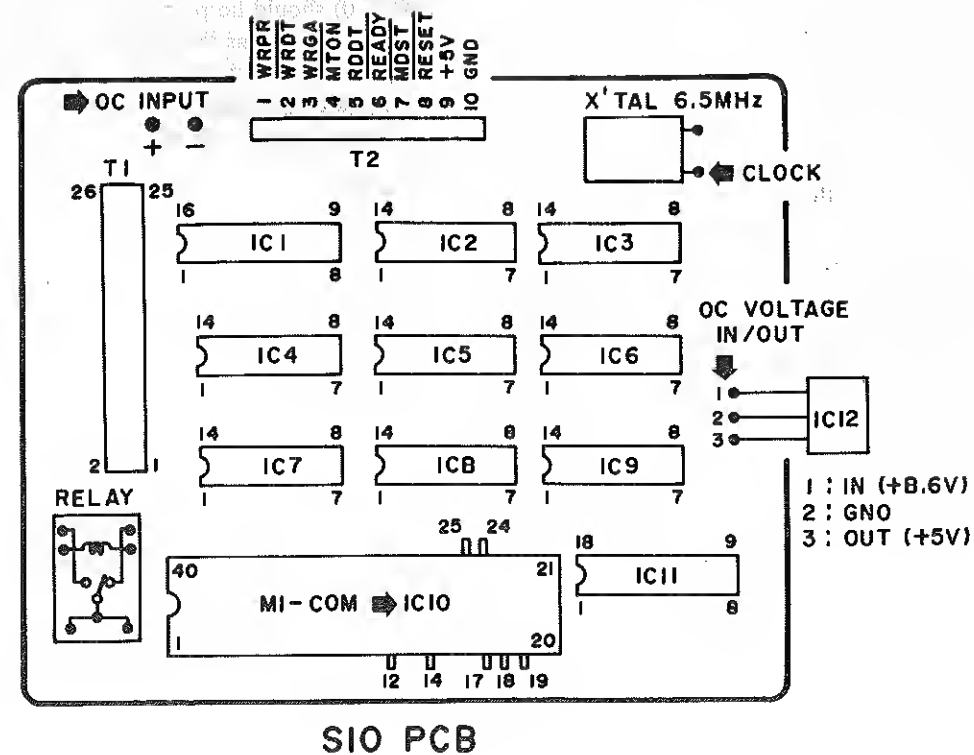


Fig. 7-5 SIO PCB Check Point for Troubleshooting

1) MOTOR does not turn

* Check while Loading (Reading)

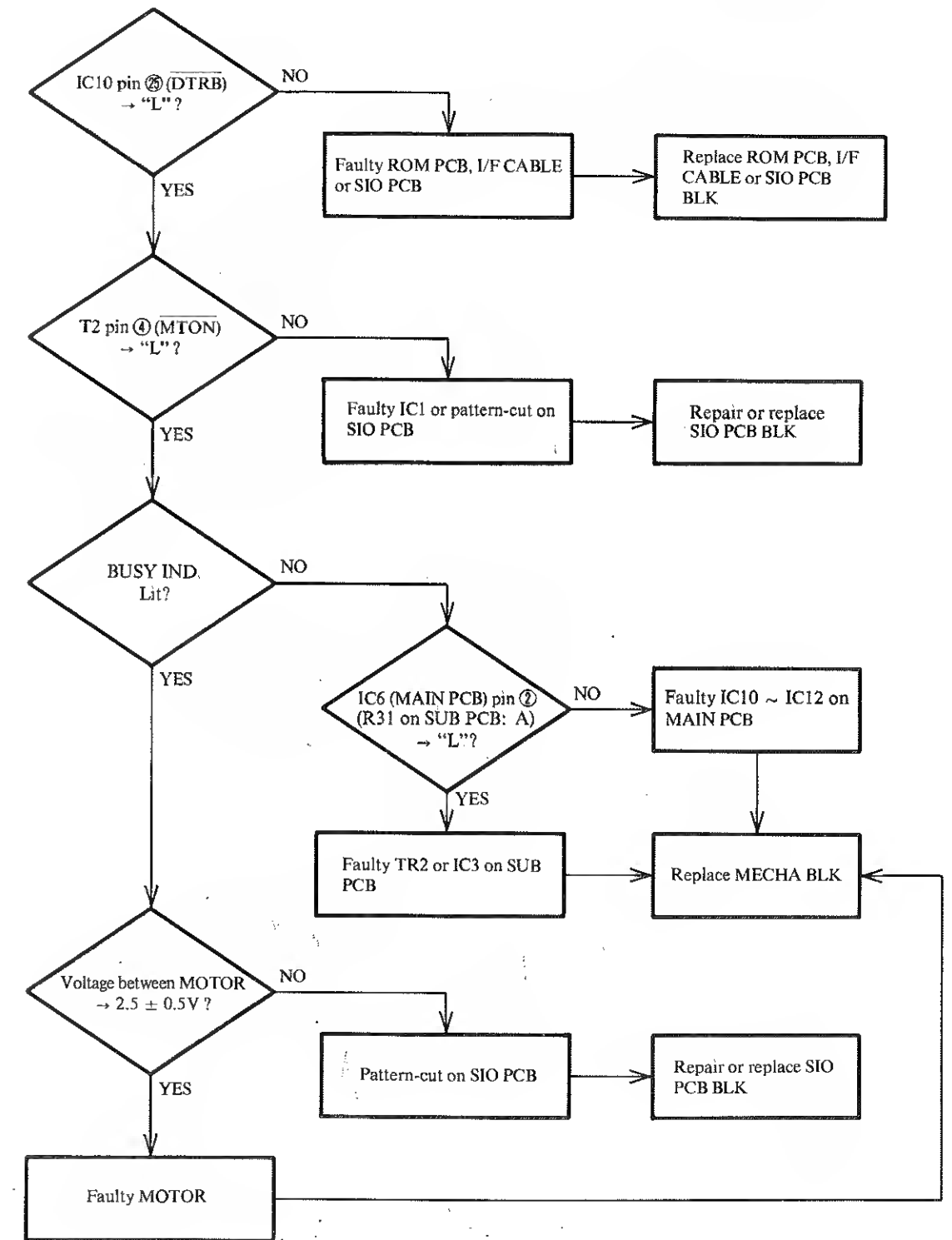


CHART (1)

2) SAVE (WRITE) malfunctions (I)

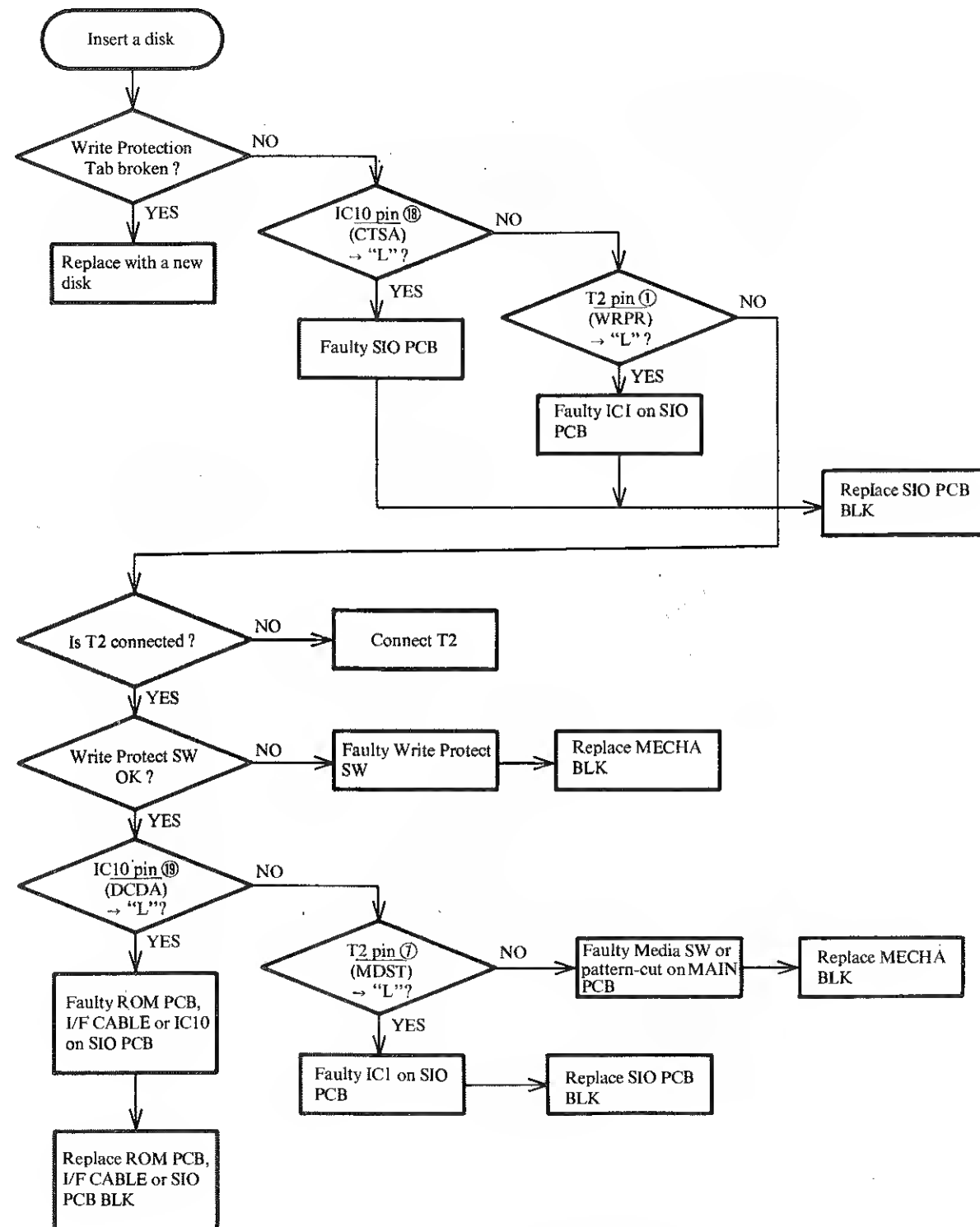


CHART (2)

3) SAVE (WRITE) malfunctions (II)

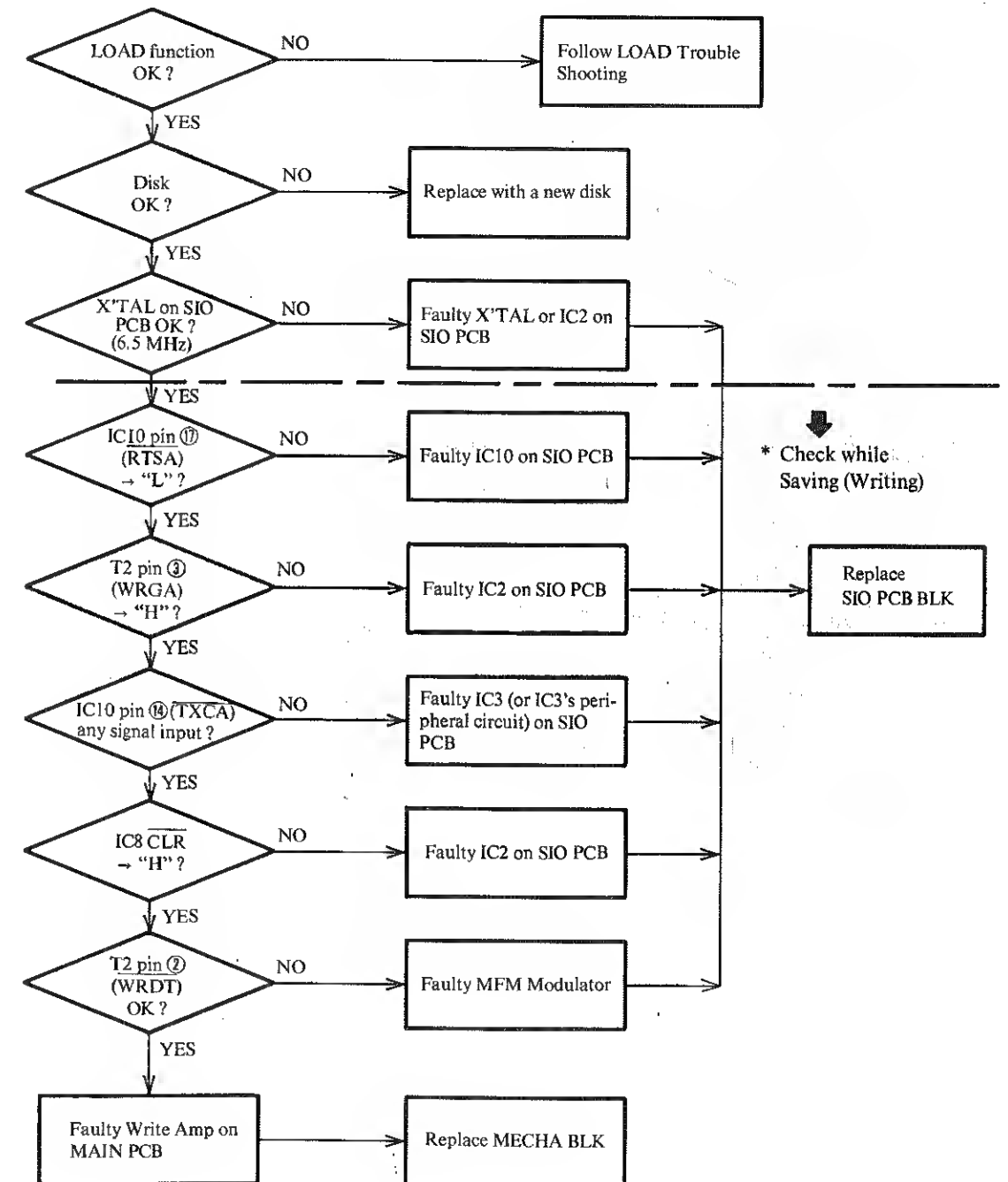


CHART (3)

4) LOAD (READ) malfunctions

* Check while Loading (Reading)

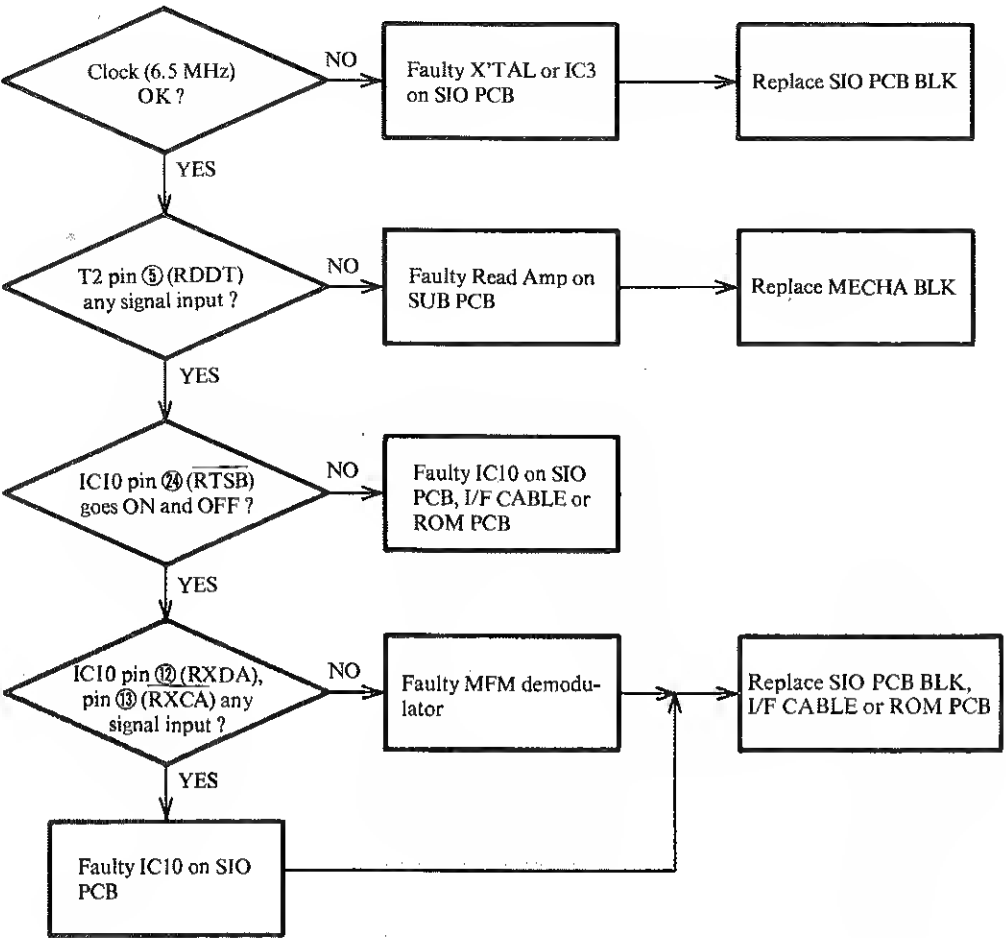


CHART (4)

VIII. REPLACEMENT METHOD OF EACH BLOCK

8-1. MECHA BLOCK REPLACEMENT METHOD

- 1) Remove the upper cover (6 screws), disk lid (2 screws) and disk escutcheon (L/R) (4 nylon revets).
- 2) Remove the connector (T2), 3 pieces of lead wire (black, white and red) from the LED PCB and mecha block (4 screws).
- 3) Install a new mecha block by following the reverse procedure of the above.
- 4) After the mecha block is replaced, must connect S612 with the MD280 and insert the test media into the MD280. Then confirm the operation.

8-2. REPLACEMENT METHOD OF SIO PCB BLOCK

- 1) Remove the upper cover (6 screws) and pull out the connectors T1 and T2.
- 2) After removing the following wires on the SIO PCB, remove the SIO PCB block (5 screws).
 - DC power cord (+/-)
 - GND wire (VLT)
 - Capacitor lead
- 3) Install a new SIO PCB block by following the reverse procedure of the above.
- 4) After the replacement, make sure to confirm the operation of the MD280 using the test media.

8-3. REPLACEMENT METHOD OF I/F CABLE

- 1) Remove the upper cover (6 screws), connector (T1) on the SIO PCB and then remove the cable clamp (2 screws) for the IF cable.
- 2) Remove the cover cartridge (A) (3 screws) of cartridge section, ROM PCB (2 screws), GND cable clamp and then remove the connector (CN1) from the ROM PCB by using the desoldering tool.
- 3) Install a new I/F cable by following the reverse procedure of the above.
- 4) After the replacement, make sure to confirm the operation of the MD280 using the test media.

8-4. REPLACEMENT METHOD OF ROM PCB

- 1) Remove the cover cartridge (A) (3 screws) of cartridge section.
- 2) Remove the ROM PCB (2 screws) and then remove the connector (CN1) from the ROM PCB by using the desoldering tool. With this disoldering tool (HAKKO ACE No. 481 etc.), the connector can smoothly removed from the PCB without any damage of pattern surface.
- 3) Install a new ROM PCB by following the reverse procedure of the above.
- 4) After the replacement, make sure to confirm the operation of the MD280 using the test media.

IX. PC BOARD TITLES AND IDENTIFICATION NUMBERS

PC Board Title	PC Board Number	REMARKS
MAIN PC Board	—	Located on the Mecha Block
SUB PC Board	—	
SIO PC Board	69-5133	
ROM PC Board	69-5154	

SECTION 2

PARTS LIST

TABLE OF CONTENTS

1. DISK DRIVE UNIT BLOCK MD280	25
2. FINAL ASSEMBLY BLOCK	26
INDEX	49

This Manual is FOR INTERNAL USE ONLY and must not be made available to unauthorized personal. No part of this manual may be reproduced in any form without permission from AKAI-ELECTRIC CO., LTD., Tokyo, Japan.

ATTENTION

1. When placing an order for parts, be sure to list the parts no. model no., and description of each part. If any of this information is omitted, there are instances in which parts cannot be shipped or the wrong parts will be delivered.
2. Please be careful not to make a mistake in the parts no. If the parts no. is in error, a part different from the one ordered may be delivered.
3. Because part numbers and part definitions and supply in the Preliminary Parts List may have been the subject of changes, please use this parts list for all future reference.

HOW TO USE THIS PARTS LIST

1. This Parts List shows those parts which are considered necessary for repairs. Other parts, such as resistors and capacitors, are shown in the "Common List for Service Parts" from which these parts should be selected and parts.
2. The Recommended Spare Parts List shows those parts in the Parts List which are considered particularly important for service.
3. Parts not shown in the Parts List and "Common List for Service Parts" will not in principle be supplied.
4. How to read the parts list

a) Mechanism Block

b) P.C Board Block

2. HEAD BASE BLOCK

REF. NO.	PART NO.	DESCRIPTION
2-1x	BH-T2023A320A	HEAD BASE BLOCK GX-F66R
2-2	HP-H2206A010A	HEAD R/P PR4-8FU C
2-3	ZS-477876	PAN20x03STL CMT
2-4	ZS-536488	BID20x08STL CMT
2-5	ZG-402895	CS ANGLE ADJUST SPRING

SP (Service Parts) Classification

A small "x" indicates the inability to show that particular part in the Photo or Illustration.

This number corresponds with the individual parts index number in that figure

This number corresponds with the Figure Number

6. SYS. CON. P C BOARD BLOCK

REF. NO.	PART NO.	DESCRIPTION
6-1	BA-T2034A070A	PC SYS CON BLK GX-F44R
6-1C1	EI-324536	IC HD14049BP
6-1C2	EI-336801	IC MB8841-564M
6-1C3	EI-331661	IC SN7405N
6-1C4	EI-336725	IC M54527P
6-TR1to4	ET-200985	TR 2SC2603 F,G
6-TR5to28	ET-554657	TR 2SA733A P,Q
6-D1	ED-318292	D SILICON H 1S2473T-77 T26
6-D2to4	ED-308952	D GERMA V 1K34A-LR F07
6-D5to10	ED-318292	D SILICON H 1S2473T-77 T26
6-X1	EI-318384	OSC X'TAL NC-18C 3.579545MHZ

SP (Service Parts) Classification

These reference symbols correspond with component symbols in the Schematic Diagrams.

5. The kind of part and its installation position can both be determined by the Part Number. To determine where a part number is listed, utilize the Parts Index at the end of the Parts List. It is necessary first of all to find the Part Number. This can be accomplished by using the Reference Number listed at the right of the part number in the Parts Index.

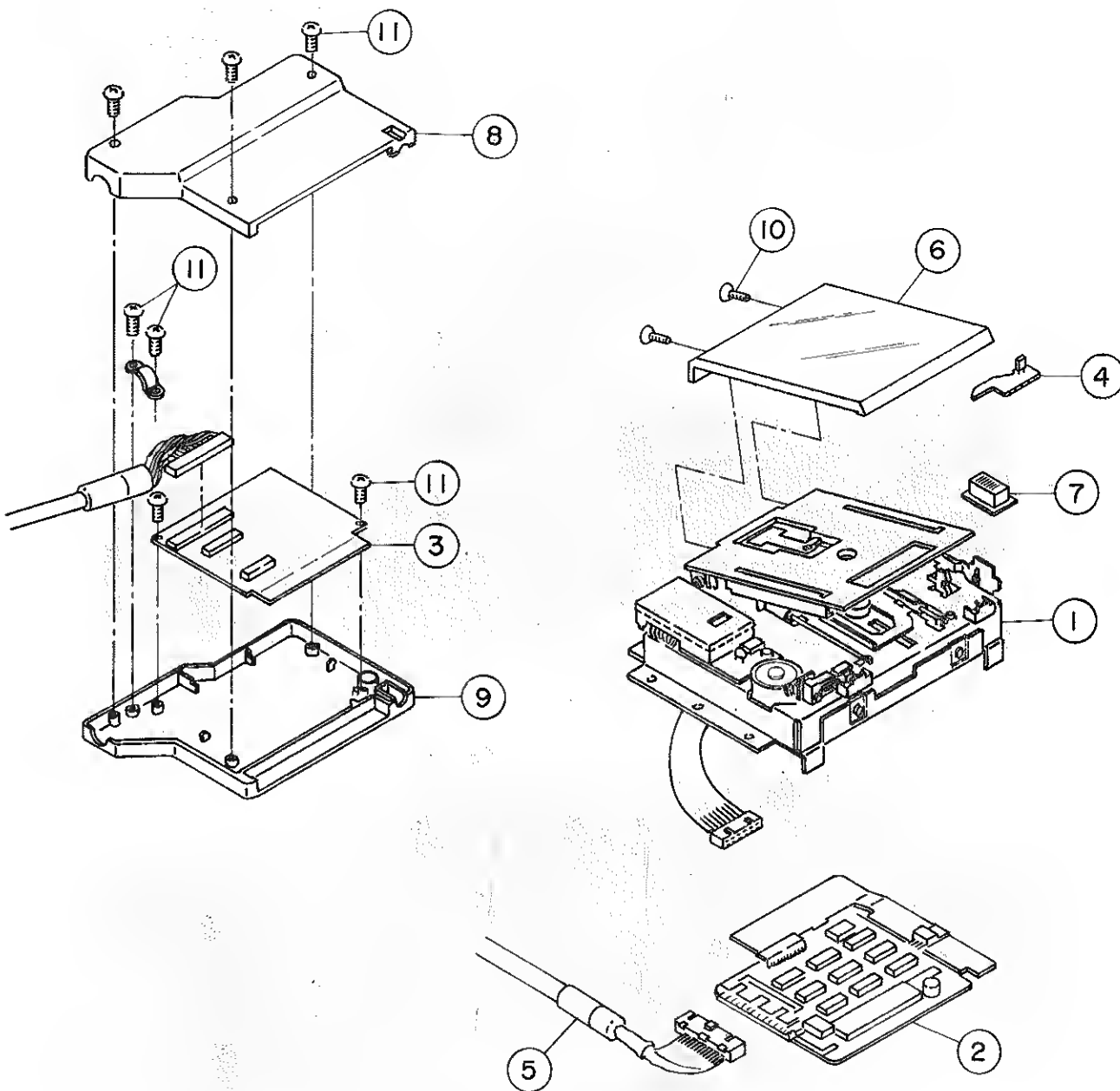
WARNING

⚠ INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURE'S RECOMMENDED PARTS

AVERTISSEMENT

⚠ IL INDIQUE LES COMPOSANTS CRITIQUES DE SÉCURITÉ. POUR MAINTENIR LE DEGRÉ DE SÉCURITÉ DE L'APPAREIL, NE REMPLACER QUE DES PIÈCES RECOMMANDÉES PAR LE FABRICANT

DISK DRIVE UNIT BLOCK

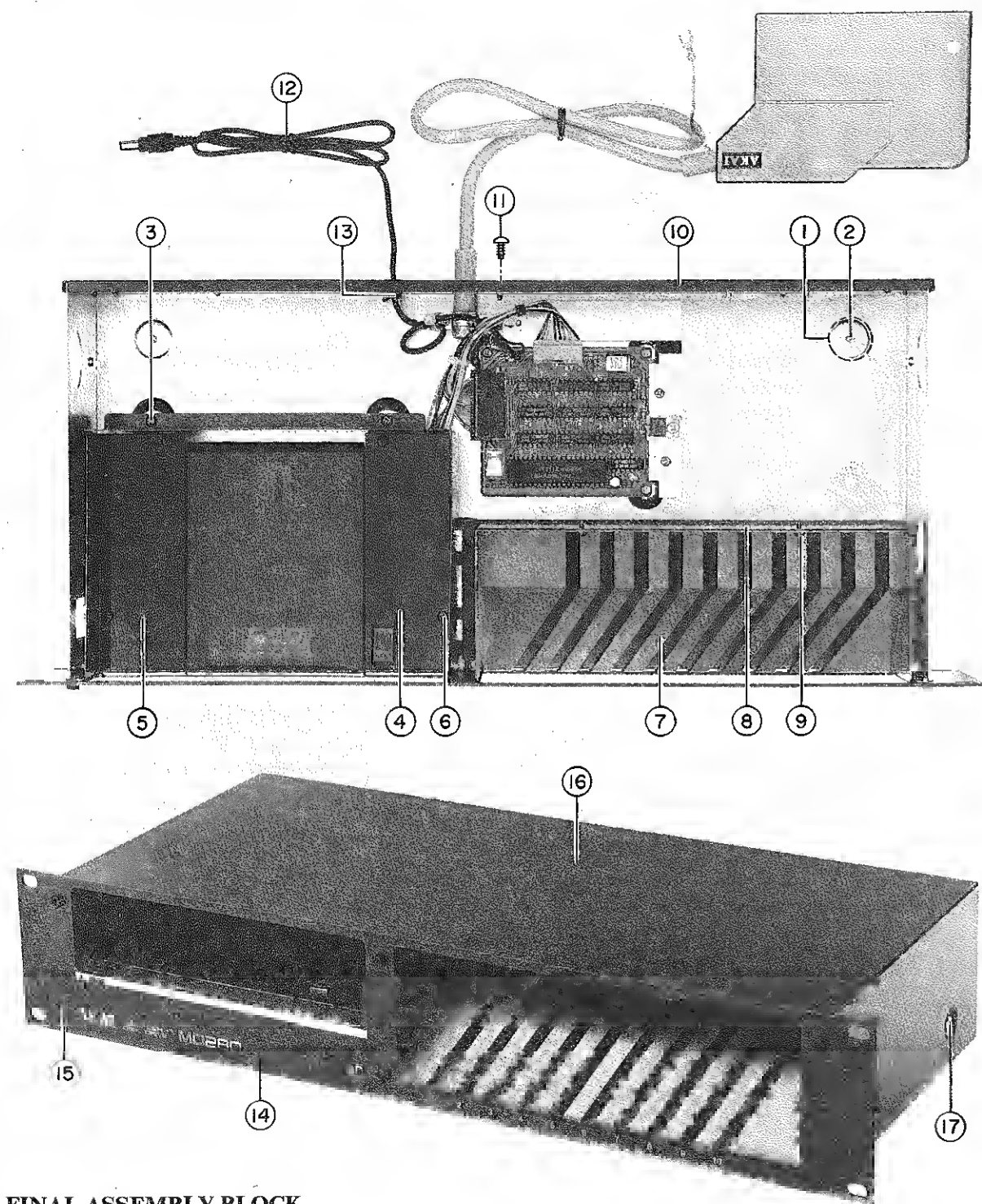


1. DISK DRIVE UNIT BLOCK MD280

REF. NO.	PART NO.	DESCRIPTION
1-1	BB-716800	MECHA BLOCK MD280
1-2	BA-716802	PC SIO BLK
1-3	BA-716806	PC ROM BLK
1-4	BA-716801	PC LED BLK
1-5	EW-716803	CABLE 1/F
1-6	BD-716798	LID DISK
1-7	SK-716799	KNOB EJECT
1-8	BC-716808	COVER CARTRIDGE (A)
1-9	BC-716805	COVER CARTRIDGE (B)
1-10	ZS-716807	T2CTS30x060 BNI
1-11	ZS-609120	T2PAN30x06STL CMT
1-12x	MB-717095	BELT

INDEX

FINAL ASSEMBLY BLOCK



S612 MD280

PART NO.	REF. NO.	PART NO.	REF. NO.	PART NO.	REF. NO.	PART NO.	REF. NO.
AX-717097	1-13x	EZ-309882	2-13	ZS-320906	2-3		
BA-716801	1-4	MB-717095	1-12x	ZS-341960	2-17		
BA-716802	1-2	SA-324129	2-1	ZS-344754	2-2		
BA-716806	1-3	SE-360738	2-8	ZS-345272	2-9		
BB-716800	1-1	SE-360739	2-4	ZS-361253	2-15		
BC-716805	1-9	SE-360740	2-5	ZS-609120	1-11		
BC-716808	1-8	SK-716799	1-7	ZS-716807	1-10		
BD-360734	2-14	SP-360735	2-10	ZW-231030	2-6		
BD-716798	1-6	SP-360736	2-16				
EW-360747	2-12	SZ-360737	2-7				
EW-716803	1-5	ZS-319460	2-11				

2. FINAL ASSEMBLY BLOCK

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
2-1	SA-324129	FOOT	2-10	SP-360735	PANEL REAR
2-2	ZS-344754	ST PAN30x06STL CMT C080 (FOOT FIX)	2-11	ZS-319460	T2BR30x06STL BZN PROJECTION (PANEL REAR FIX)
2-3	ZS-320906	ST BR30x06STL CMT (MECHA FIX)	2-12	EW-360747	CORD JXP1513
2-4	SE-360739	ESCUTCHION DISK (R)	2-13	EZ-309882	STRAIN BELIEF SR-2M-4
2-5	SE-360740	ESCUTCHION DISK (L)	2-14	BD-360734	PANEL FRONT
2-6	ZW-231030	RV NYL30x045 BL (ESCUTCHION DISK FIX)	2-15	ZS-361253	SCREW PANEL (PANEL FRONT FIX)
2-7	SZ-360737	HOLDER DISK	2-16	SP-360736	COVER UPPER
2-8	SE-360738	MASK DISK	2-17	ZS-341960	ST BID40x06STL BNI (COVER UPPER FIX)
2-9	ZS-345272	ST BR30x06STL BNI			

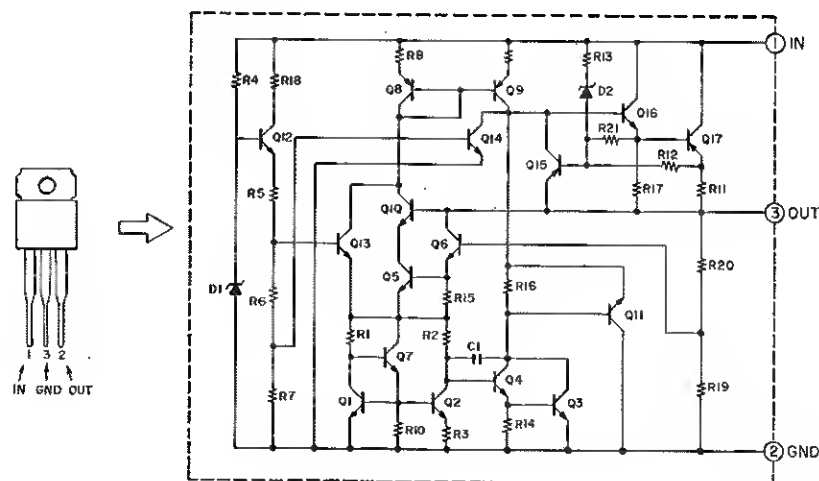
AKAI

SECTION 3 SCHEMATIC DIAGRAM

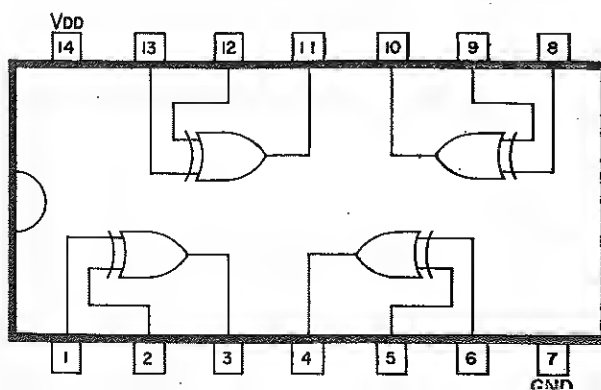
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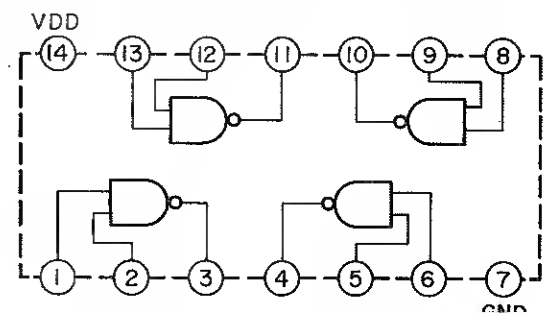
μ PC17805H (Voltage Regulator)



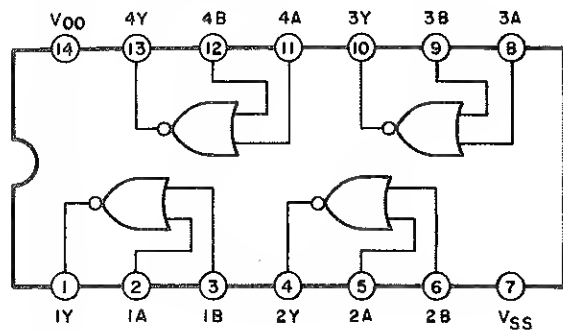
HD14070BP (Quadruple Exclusive-OR Gate)



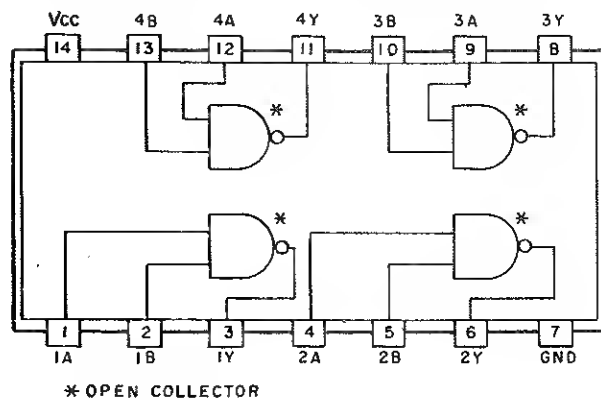
HD14081BP (Quadruple 2-input AND Gate)



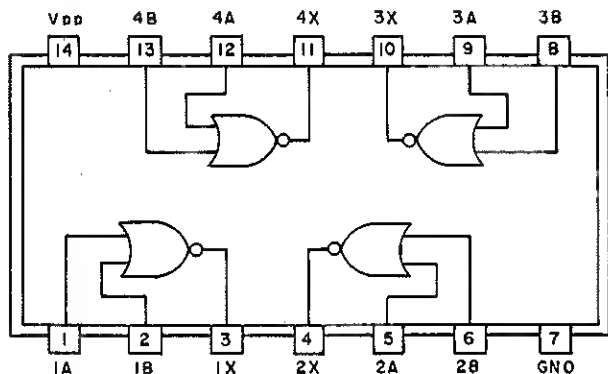
TC74HC02P (Quad 2-input NOR Gate)



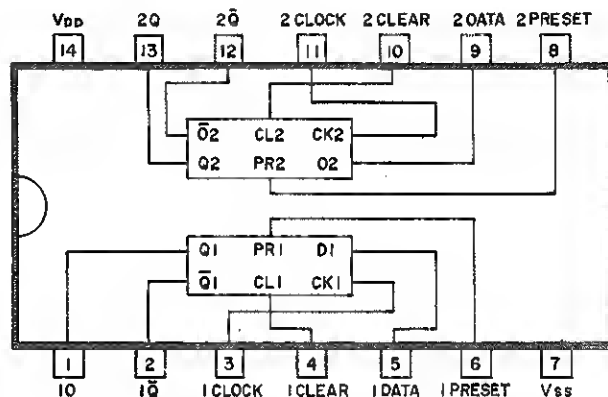
HD7438P, TC74HC00P (Quad 2-input NAND Gate)



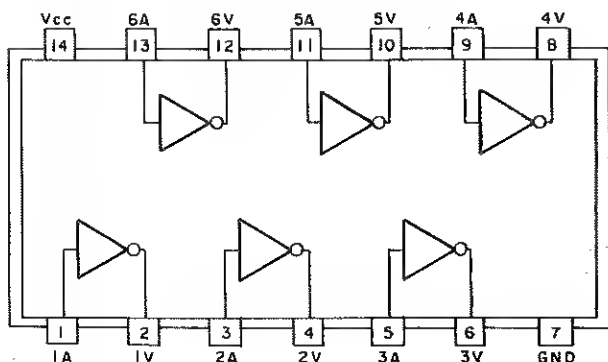
HD14001BP (Quadruple 2-input NOR Gate)



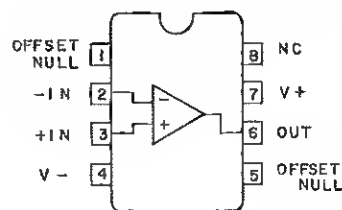
HD14013BP (Dual D-type Flip Flop)



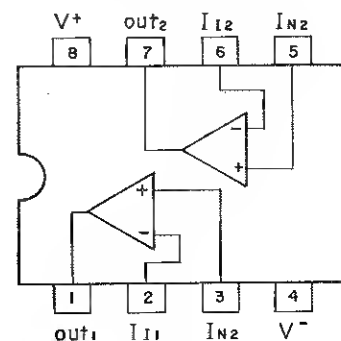
HD14069UBP, TC74CU04P (Hex Inverter)



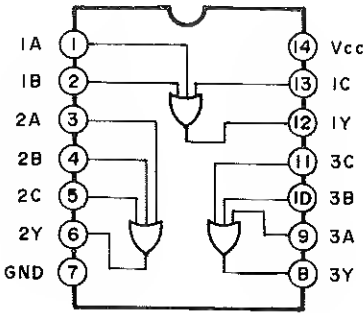
μ PC311C (Single Internally Voltage Comparator)



μ PC4560 (Dual Operational Amplifier)



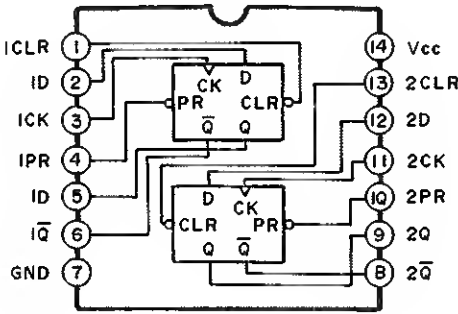
HD74HC4075P (Triple 3-input OR Gates)



HD74HC74P (Dual D-type Flip Flop)

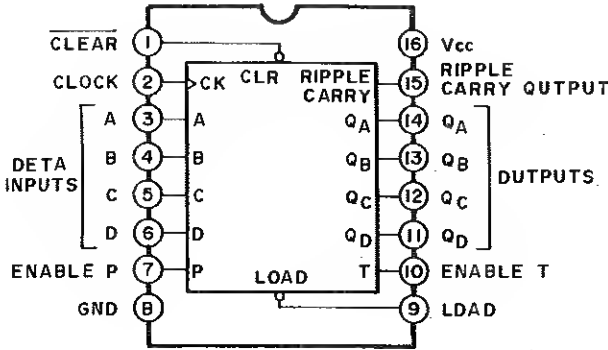
Input				Output	
Preset	Clear	Clock	Data	Q	\bar{Q}
H	H	x	x	H	L
H	L	x	x	L	H
L	L	x	x	H*	H*
H	H		H	H	L
H	H		L	L	H
H	H	L	x	no change	no change
H	H	H	x	no change	no change
H	H		x	no change	no change

* Stays "H" while Preset and Clear are "L".



HD74HC161P (Sync Binary Counter)

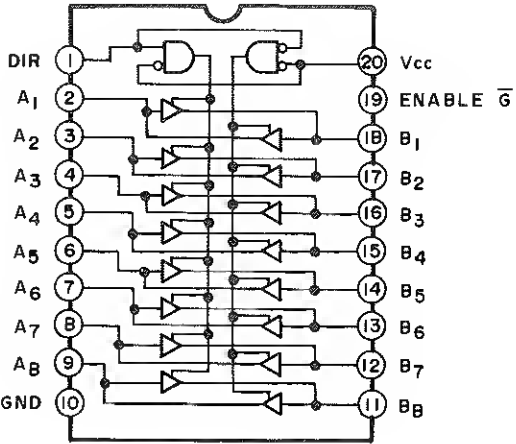
Inputs					Outputs
Clock	Clear	Load	Enable P	Enable T	Q_n
	L	x	x	x	Reset-Clear
	K	L	x	x	Load Input Data
	H	H	H	H	Count
	H	H	L	x	No Count
	H	H	x	L	No Count



HD74HCT245 (Octal Bus Transceiver)

Enable \bar{G}	Direction Control DIR	Operation
L	L	B data to A bus
L	H	A data to B bus
H	x	Isolation

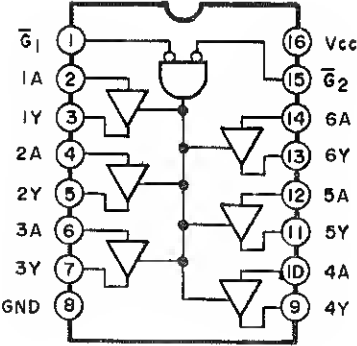
H: High level
L: Low level
x: Irrelevant



HD74HC365P (Hex Bus Buffer)

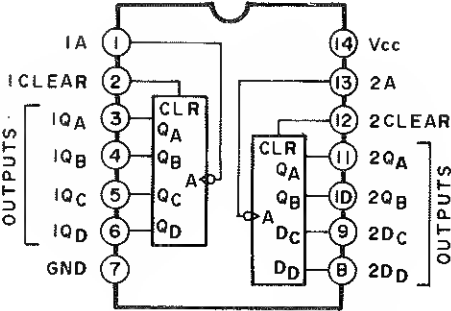
Input			Output
\bar{G}_1	\bar{G}_2	A	Y
H	x	x	Z
x	H	x	Z
L	L	L	L
L	L	H	H

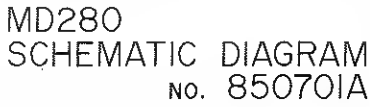
H: High level
L: Low level
Z: High impedance
x: Don't care ("H" or "L")

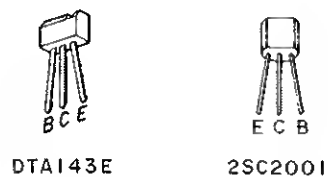
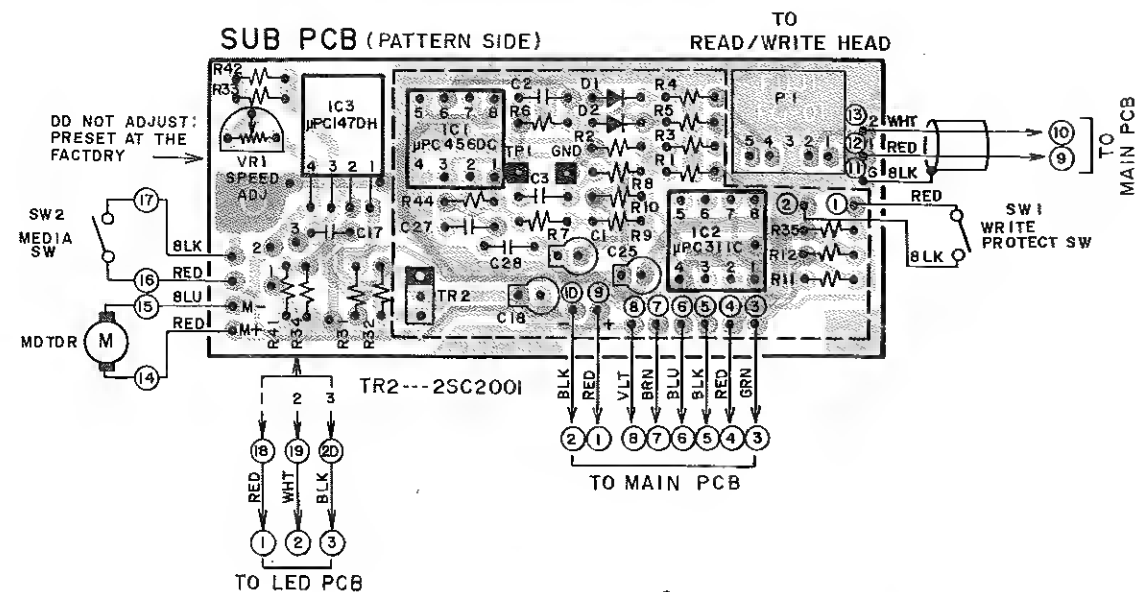


HD74HC393P (Dual Binary Counter)

Clock	Clear	Outputs
x	H	L
H	L	No Change
L	L	No Change
	L	No Change
	L	Advance to Next State

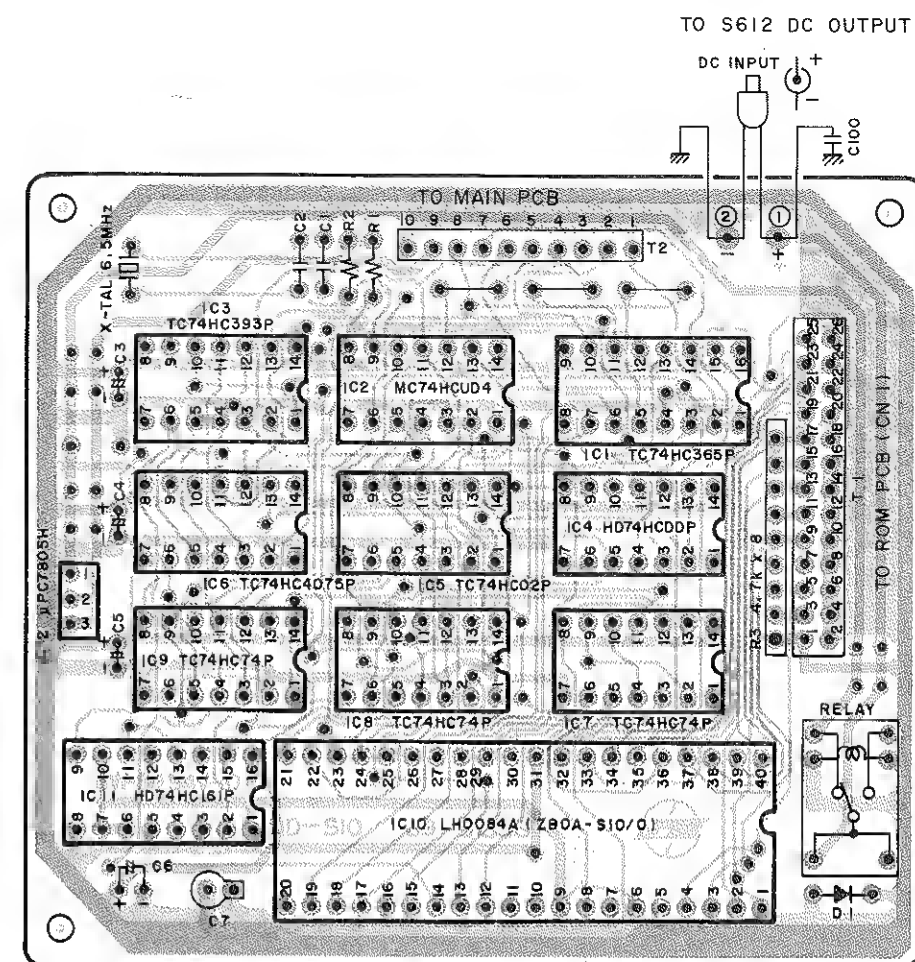
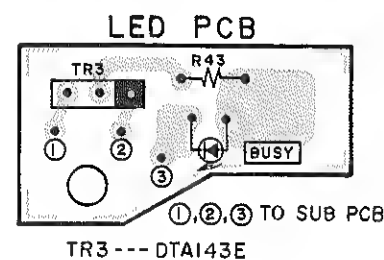




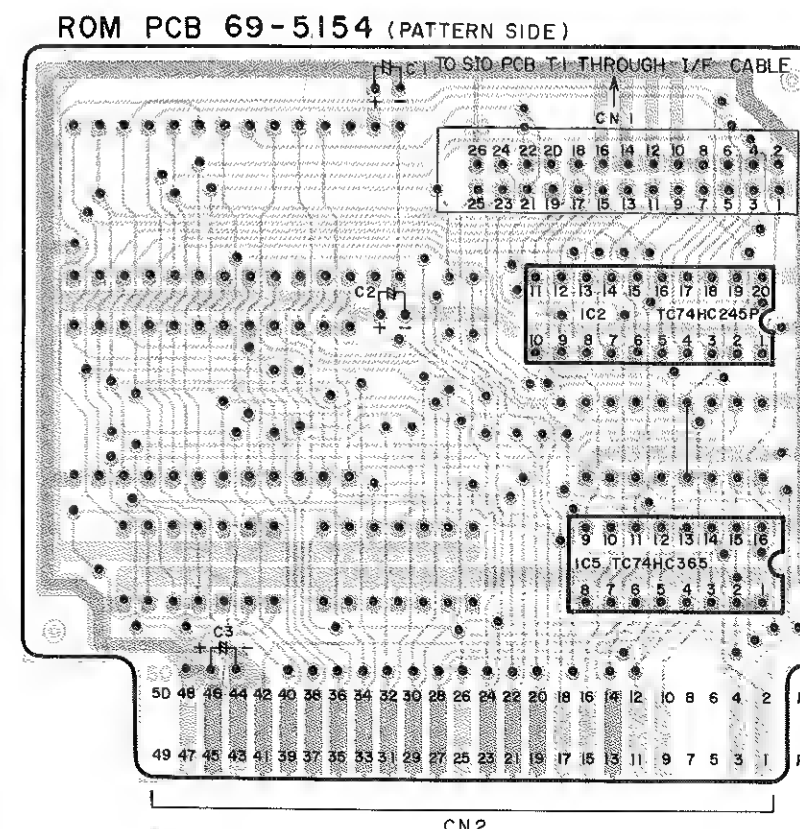
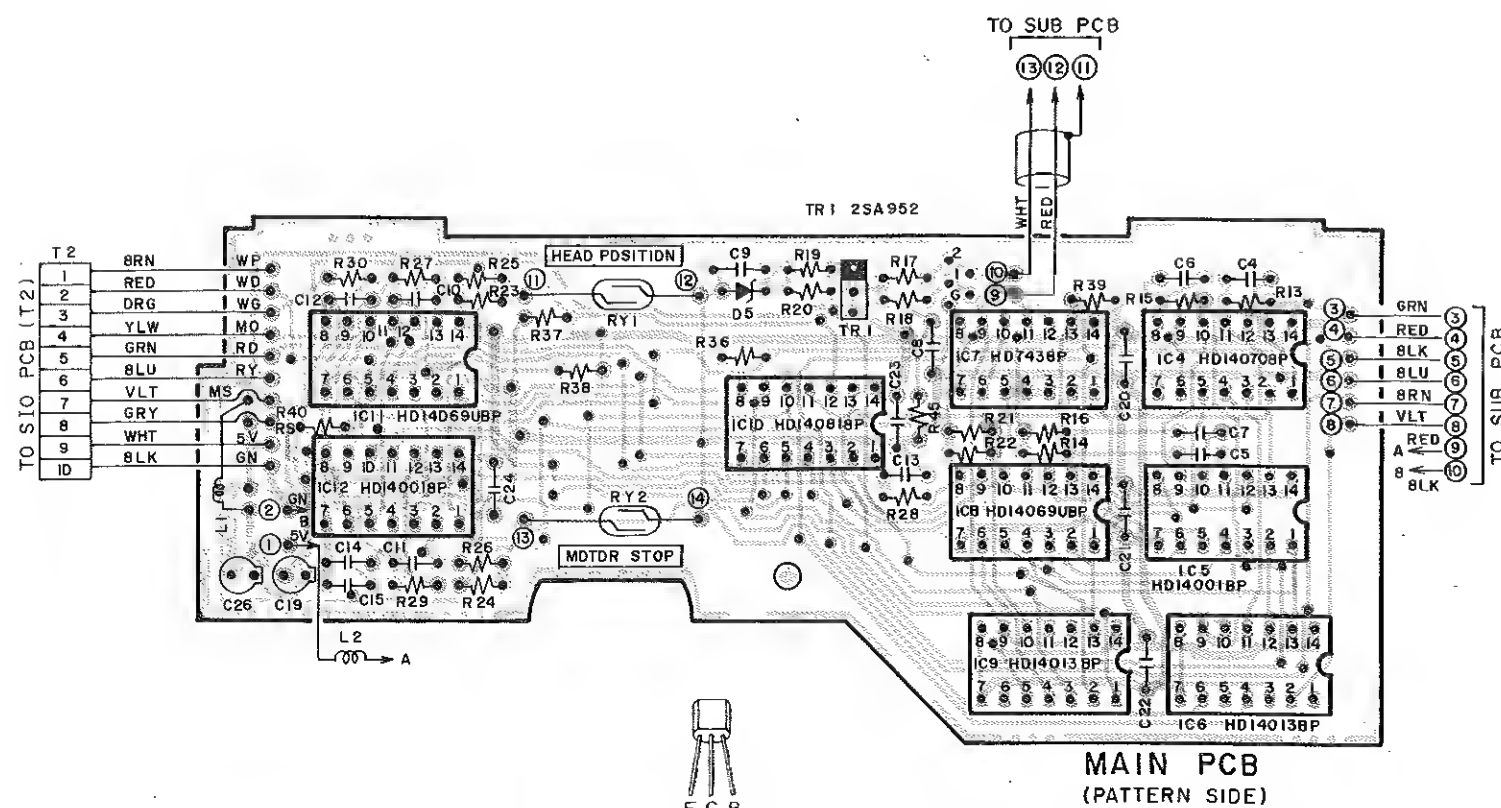


••• = NPN TRANSISTOR

••• = PNP TRANSISTOR



SIO PCB 69-5133 (PATTERN SIDE)



ROM PCB 69-5154 (PATTERN SIDE)

AKAI ELECTRIC CO., LTD.

12-14, 2-Chome, Higashi-Kojiya, Ohta-Ku, Tokyo, Japan

TEL: Tokyo (742) 5111 CABLE: HIFIAKAI TOKYO TELEX: J26261

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